THE

AMERICAN FARMER:

DEVOTED TO

Agriculture, Horticulture and Rural Economy.

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"AGRICOLAS." . . . . . *Virg.*

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JUNE.

"How mild is the zephyr that blows!
What fragrance his balmy wings bear—
He breathes as if fearful to brush from the rose
The dew-drops so tremulous there!
The stream flowing gently beside the green crestes
So lightsomely dashes their tendrils away—
It seems some fond mother who while she caresses,
Would sportfully chide her young children at play.
Hear the minstrel-bee lulling the blossoms to rest,
For the nectar he sips as the wild-flowers' guest."

WORK FOR THE MONTH.

The month of June should keep us especially busy with all planted crops and on all cultivated grounds. The grass and weeds will spring apace wherever there is a chance for it, and in keeping under such intruders, it is very true that "a stitch in time saves nine."

CORN.

In view of the circumstances of the times, the great Corn crop becomes a matter of especial interest. The presumption is that the planting is finished, and while it is needless to urge the extension of the crop already laid out, it is not too late to impress the necessity of other methods of increase, that the land already planted may yield its utmost. It is not too late to manure the corn with any fertilizer you may be able to command. If you can't give large dressings give small ones. Spread broadcast if you have enough. Otherwise such manurings as we have advised in late numbers for the hill, may be dropped in a furrow alongside of the corn. Plaister of Paris (gypsum) is a very cheap fertilizer on such land as it will act on at all, and we have seen it applied with great advantage sown broadcast, a bushel to the acre, when the corn is just so high that it may be thrown over the tops of it. The latter part of the month will be time enough, or it may be done earlier. In the lack of ability to purchase manures, be sure to make available all at your command, and there are few farms where there are not some unused resources. Do not delay "thinning" too long. Whenever it is safe from worms and birds, the sooner the number of plants is reduced to what is necessary the better. The rule we have prescribed in the cultivation of corn is to work deeply before planting, but let it be shallow after. The mere stirring of the surface is all that is required for the sake of the corn, and this can be sufficiently done with the cultivator; if by bad management or bad fortune the field gets grassy, the plough must be used to subdue it. Avoid this by working quickly.

TOBACCO.

There are many planters who will find it the part of wisdom to substitute grain or vegetables on a portion of their Tobacco ground. In all the Southern States it is of the utmost consequence that large supplies for man and beast be raised. Potatoes, Roots for stock, Cabbages, Hungarian Grass, Field Peas, may all be still planted and will pay well on the well manured tobacco ground. Those who still plant will of course have their land by this time in such a state of readiness as to cause no delay when the plants are in readiness. After the 10th of June planting seasons become precarious. We do not advise, however, that very small plants be planted even to save a "season." A well grown, well rooted plant is so much superior to a small one that there are a great many more chances of its growing off readily and maturing in good time,

than a small plant, though planted much earlier. See that the plants are taken carefully from the beds without breaking the roots or bruising the leaves unnecessarily, and do not tumble them into the body of a cart, but transport them in baskets to the field. See that only good plants are dropped on the hill, and that the planter opens the earth well, puts in the plant without doubling up the root, and presses the earth up to the full depth of the root. At each successive season the previous planting will be carefully gone over and the missing hills replanted with good plants reserved from the general planting for the purpose. The first hoeing, usually termed "weeding," should be given as soon as the plants show indications of having taken hold of the ground. The crop grows off more kindly when cleaned out early. By no means allow the hills to get grassy. This weeding should be done with great care, lest the plants be bruised, or knocked out of the hill; grass starting very close to the plants should be picked out with the fingers. Should a very dry and hot spell come before the weeding is done, it may be necessary to postpone for a shower of rain—otherwise a great many plants are killed.

HAY.

Orchard grass and clover will be ready to cut early in the month. Take time by the forelock and be too early rather than too late with your cutting. When about half the clover blossoms have turned brown is thought the proper time to cut, but if the crop be large and weather favourable, begin a little before that. The value of clover hay is very dependent on the manner of curing. It is very desirable not to have it get wet after being cut. It may be safely cured in cocks after a little exposure to sun and air.

WHEAT HARVEST.

Make all needful preparation for wheat harvest in advance, that there be no delay when the crop is in condition to be saved. Engage at once such extra labour as you may need. Get all tools and implements in order. Have all necessary work despatched, leaving corn field and tobacco field clear of grass.

TIME OF CUTTING.

When the Wheat is in the dough state, it is fit to cut. Be not misled by stereotyped directions to begin two weeks before the grain is ripe. It requires much watchfulness and some experience to be able to determine just the point at which to begin operations. There is loss in beginning too early and risk in delaying too long. Watch for the proper time and be in readiness to begin promptly when it arrives.

POTATOES.

In the great demand there is likely to be for edibles of every sort, we advise you to increase the crop of Potatoes. The main crop should not be planted before the latter portion of the month. Peach Blows and other slow-growing sorts may be planted somewhat earlier. Medium sized Potatoes, planted whole, are best for seed, but if economy in seed is an object, they should be cut in pieces, giving two eyes to a set. Cut them a week or more before planting and spread in a dry place that the cut may heal.

THE FIELD PEA.

The Field Pea for any purpose may be planted or sown during this month, but the earlier the better. For improvement of land sow broadcast, for seed sow in drills three feet apart.

PUMPKINS AND CYMBLINS.

These may be planted up to the middle of the month.

HUNGARIAN GRASS

May be sown during the month.

BROADCAST CORN AND SUGAR MILLET.

These may still be sown for green food.

MANGOLD WURTZEL AND SUGAR BEET.

It is not too late yet to get a crop of these roots.

RUTA BAGA.

The ground for Ruta Baga should be ploughed and, if practicable, manured this month, they should not be sown earlier than the middle of July.

THE VEGETABLE GARDEN.

JUNE.

The work of the Garden must be diligently prosecuted now. The growth of grass must be absolutely interdicted, and the young plants of all sorts nursed and cared for. Keep the surface well stirred, destroy insects, water in dry weather and give all necessary attention that this season of rapid growth may not be wasted in a vain struggle for life.

WATER.

A supply of water is a great want in every garden. Our hot, dry summers make it an almost indispensable adjunct of a garden. When necessary to be used it should be used not frequently in small quantities, but copiously and less often.

INSECTS.

To protect young plants from insects, use some infusion which while it stimulates their growth, will be distasteful to the enemies which prey on them. Tobacco stems or stalks, horse manure,

elder leaves, soot, &c. may be thrown into a barrel and water enough used to make an infusion not so strong as to destroy the plants, and use this frequently while the plants are young and tender.

POTATOES.

Keep the early crop clear of grass and weeds, drawing a little earth to them at each working.

CLEARING OFF EARLY CROPS.

Early crops of Spinach, Radish, Lettuce, may be cleared off this month, and the ground occupied now with late Beets or Cabbage, Celery, &c.

CABBAGE, BROCCOLI, CAULIFLOWER.

If you have not a promise of plants enough for late crops of these vegetables, re-sow the beds at once and force them by frequent manurings with fine manure, guano, or by watering freely with the infusion mentioned above.

PEAS AND BEANS.

Late crops of these may be planted for a succession. Plant to a good depth and they will be less affected by drought.

ROASTING EARS.

Corn may still be planted for late use.

TOMATOES AND EGG PLANTS.

If you have not enough plants set out to secure an ample supply of these throughout the season, plant more now.

LIMA BEANS.

These may still be planted.

CUCUMBERS.

These may still be planted for table use. For pickles postpone till July.

CELERY

May be planted the latter part of the month. Prepare the trenches whenever you have time. Make them two feet wide and twelve inches deep—then mix three or four inches of well rotted manure by digging it well up with the soil at the bottom of the trench, and let it stand till you are ready to plant.

CYMBLINS.

These may be planted still.

ONIONS.

If the tops of Onions grow very luxuriantly and bulbs do not form, press the tops gently to one side, bending them down to check the flow of sap. Weed very carefully so as not to disturb the bulb, and draw no earth to them in working.

HERBS.

As the several Garden Herbs come into flower they should be cut on a dry day, and spread in a shady place to cure. Set out plants of different herbs.

THE FLOWER GARDEN & LAWN.

Keep your walks clean, passing the roller over them frequently. Cut the grass as often as necessary, say once in two or three weeks, and follow with the roller.

Stir up frequently the surface of flower beds and keep clear of weeds. Take away suckers from around trees.

CARNATIONS, &C.

Keep Carnations and other herbaceous plants tied up neatly to stakes.

ASTERS, BALSAMS, ZINNIAS AND OTHER ANNUALS

Should be still planted out in borders or beds.

TULIPS AND HYACINTHS.

As soon as the foliage of these dies off, take them up and keep in a cool, dry place.

DAHLIAS.

Dahlias planted now will bloom finer in the fall than those planted earlier. Train to a single stem, removing all side shoots, and tie up to a stake.

ROSES.

Roses that have not been put out, should now be plunged in the borders or planted out. Budding may be done and cuttings struck.

THE GREEN HOUSE.

CAMELLIAS.

If not done already, these should be removed at once from the Green House. Syringe freely overhead in hot weather to keep down the red spider.

FUCHSIAS, CINERARIAS, GLOXINIAS, ACHIMENES,

Should be now in fine condition. Admit air freely at all times in fine weather, and syringe overhead morning and evening, to preserve moisture and keep down insects. Save seeds of Cinerarias, and multiply choice kinds by division of the roots.

AZALEAS

May now be placed out of doors. Plunge the pots about half way up to the rim in sand; put cuttings of the young wood in sand and keep in a close, shady place.

PELARGONIUMS.

In the latter part of the month most of the kinds will be out of bloom, when they should be removed to the open air and headed down. Put down cuttings to form new plants.

There are over three hundred nurserymen, florists and seedsmen in the neighborhood of London.

FRUIT GARDEN AND ORCHARD.

STRAWBERRIES.

After the bearing season is over, the mulch should be taken off the beds and the ground cultivated. The growth of runners should be encouraged if young plants are wanted, otherwise they should be cut off as they appear. New beds may be planted at any time when the ground is wet, and should be made on ground which has been cultivated repeatedly in some hoed and manured crop and likely to be free from grass seeds.

FALLEN FRUIT.

The fallen fruit should be gathered from under the trees and taken away to the pigs. Give the trees a gentle shaking, that such as are punctured may fall off.

THE NURSERY.

NEWLY GRAFTED AND BUDDED TREES.

Take off the clay and loosen the bandages of your grafted trees. If these have made very vigorous growth, it may be necessary to protect them against storms, by securing them to stakes.

THE VINEYARD.

Do not interfere with your vines now for any purpose until the bloom is over. After that let the young shoots, as they advance, be neatly tied up in such manner as to give them the full benefit of sun and air. Keep the ground about young plants entirely free from weeds.

Small Horses.

New England has become quite celebrated, the world over, for her fine horses, no small portion of which distinction has been contributed by the different branches of the Morgan horse family, and almost the only objection made to them by purchasers is, that they are too small for common purposes. This objection may not hold good in all cases, with those who own and use them, but it is a most serious one when they are put into market, and especially when brought to our large cities for purchasers.

The idea we intended to convey in our remarks in the last number was, that with more care in breeding, we could have horses of the same blood, and the same comparative goodness, of equal proportion of bone, muscle, activity, endurance and courage, and from one to two sizes larger, which would obviate the only serious objection to our Morgan horses, if the breeders of them would but give them the care and feed necessary to keep them constantly growing from the time they are taken from the dam until fully matured. By this we do not wish it understood that we would in any way advocate pampering and over feeding, for this we believe is but little better for the animal than the neglect with which too many of the New England farmers treat their colts from the time they are taken from the mare until they are of sufficient age to be of some use upon the farm. Colts at all ages should have good care, and such quantity and quality of food as will keep them in a healthy and growing condition, rather than in a high state of flesh. In addition to this, they should have such light work put upon them as to develop their bone and muscle, but not enough, or of such kind as to overtask them.

We should think that the average weight of Morgan horses would fall nearly or quite as low as eight hundred and fifty pounds. This, every intelligent breeder knows, is more than a hundred pounds less than it need or should be, under proper and suitable breeding. Indeed we believe the average could be made a thousand pounds, which, according to our notion, is the best size, when in compact form, for a horse for all purposes of the farm and road.

Mr. Rarey, in his exhibitions in this and other cities, brings out some very diminutive ponies, scarcely more than two feet high, which he brought home with him from Europe. He thinks they are of the same race of our common horses, but which have run down to their present size from entire want of care. On the same principle we can see no reason why our Morgan horses would not become larger or smaller, according as they are bred, and still retain all their good qualities.—*American Stock Journal.*

INJURIOUS EFFECTS OF LARGE APPLICATIONS OF SALT TO THE SOIL.—In the course of a discussion at a meeting of the Highland and Ag. Society of Scotland. some were of the opinion that salt, at the rate of two to three hundred weight to the acre, was efficacious as a remedy for the turnip-fly, while others were as decidedly of opinion that it did not prevent the attacks of this pest.

With regard to salt in the large doses recommended by some—6 cwt. per acre—one member said he had tried it on a crop of mangolds, which it completely killed, so completely that he ploughed it down and sowed it to turnips, and it killed the turnips also. Another stated that a similar dose had killed his cabbage.

The error of a moment is often the sorrow of a life.

Vegetable Stimulation.

To the Editor of the American Farmer:

Dear Sir: At the risk of being considered an utopian ignoramus by the *Farmer's* agricultural M. D., and called an absolute *ammoniac* by all Peruvian guanoists everywhere, I shall unhesitatingly declare my infidelity to Dr. Pendleton's doctrine, and first setting forth my creed, that all orders and classes of vegetables *have* heart, lungs, arteries, and muscular fibres, are very properly subjects of *stimulation*—and, further, that Peruvian guano is as properly a vegetable stimulant as mustard, pepper and brandy are animal ones, I shall endeavor to prove the correctness of my position by that half of the argument which nature permits to agricultural science. Reasoning from *cause* to effect, is the only legitimate and perfectly reliable argument, whatever may be the topic; but as all manurial causes are as yet an unexplored fog-land, even to the most profound agricultural chemist, we can only argue from *effect*, and endeavor until a greater than Liebig shall appear, to remain content with that.

Dr. Pendleton gives us the definition of *stimulant* as *"an article which produces a quickly-diffused and transient increase of vital energy and strength of action in the heart and arteries."* We are in the dark as to who gets the credit of the quotation commas in the definition given; most probably, however, it is the Doctor's Pharmacopœia, as both our rival standard lexicons, Webster and Worcester, define the word *stimulate* thus: "To goad; to spur on; to prick forward; to excite by some physical or intellectual stimulus; to excite the organ in action; to animate; to encourage; to impel; to incite; to urge; to irritate."

Now, assuming that Webster and Worcester are good authority, and that we are dealing with vegetation, not humanity, we may justly conclude that whatever *impels*, incites, spurs on, or *pricks forward* the growth of a plant, is legitimately a stimulant; and that Peruvian guano will perform these offices, I think the Doctor himself will scarcely deny.

Again—taking as a stand-point the anatomical structure of man, the most perfectly organized being upon the face of the earth, and from man follow patiently, studiously along down the chain of animal existence, scrutinizing closely each individual link that connects to the one above, we shall find the general economy of animal life still the dominant principle, only modified to meet the conditions of the subject, imperceptibly assuming other forms and phases in the zoophite connections, until individuality is lost to *present* science in the lowest order of vegetables. If the reaching out towards the light of plants growing in a dark cellar, the inclination of climbing vines towards a stake or pole set several feet distant, the regular facing towards the sun of the sunflower, the instant shrinking from violence of the mimosa, and the energetic closing of the "catch-fly," imprisoning its victim, are not all unmistakable evidences of animal instinct in the vegetable world, pray what is the secret of such action? Whatever feeds or stimulates man or animals throughout the world, in another form feeds and stimulates vegetation just as universally. Brandy, the first and most favored stimulant of the animal world, will, as simple brandy, produce certain death if applied to the roots of a great variety of plants. But decompose it, change its constituents, and three doses of Cognac will *stimulate* the rose-bush to thrust out most vigorous shoots. The amount of ammonia taken into the stomach through the medium of a nicely browned halibut steak, would, in a disengaged form, produce asphixia and probable death, while the same quantity in the same form, fed to the roots of a row of garden peas twenty feet long, will *stimulate* them into a second bearing of peascods, even after they have fallen into "the sere and yellow leaf."

As Dr. Pendleton so emphatically denies the possibility of stimulating plants, I would most respectfully enquire how he accounts for the universal and almost miraculous effects produced by charcoal on all the smaller plants, flowers and succulent vegetables? I think the Doctor will not claim that charcoal contains a single atom of the constituents of plant food; and yet the germination of seeds, and the growth of all young plants, under the quickening influence of charcoal is almost magical. The reason is, that charcoal is a most powerful vegetable stimulant, or rather the medium through which a plant stimulant, in the form of carbonic acid gas, is conveyed to the imperfect organism of the embryo plant, thereby enabling it to throw out and downwards strong, vigorous roots, capable of taking up, digesting and sending to the above-ground structure the proper elements upon which depend the after thrift of the plant. This is probably the precise office of Peruvian guano, for who will pretend to say that the moderate handful of guano, containing as it does but the *one* constituent of plant food, distributed over an area of one hundred and forty-six superficial feet—which is just about the proportion of 300 pounds to the acre—can possibly contain all the

elements necessary to produce the result that under favorable circumstances inevitably follows? The truth is, the ammonia in the handful of guano has *stimulated* the young plants to send down their roots in search of those constituents which are *never exhausted in the soil*.

As however the law of compensation is everywhere, and in all things imperative, succeeding generations will have a heavy debt to pay back to impoverished soil, chargeable to the agency of Peruvian guano in this. The universal application of this just now popular agent—be it manure, *stimulant* or tonic—to all soils, under all circumstances, and for the production of all kinds of grains, plants and roots, is just as absurd as it would be to prescribe a specific diet for all nations, without regard to habits or climate. We know that the four pounds of raw whale or walrus blubber and the quart of rancid oil, upon which the Laplander dines, and which his position amid polar ice makes a necessity, would revolt the stomach of the stoutest American among us, causing him to throw up his very knee pans, unless extraordinarily secured, while our Aldermanic stews and hetereogeneous messes of fish, fowl, flesh and vegetable composites would strike aghast the abstemious denizens of the tropics. As inconsistent as this, is the scattering broad-cast indiscriminately, guanoes, bone dust, lime, plaister, superphosphates, fertilizers, and *stimulants*, as often where they are not needed as where they are, and then the complaints are as unreasonable as the *scatteration*. A. pronounces guano a humbug; B. declares lime useless; C. says plaister is a lie; D. maintains that all manipulators and manufacturers of superphosphates are cheats, and so on to the end of the chapter; growling and grumbling through the winter, and just as ready as ever when spring comes to throw away their money in the misapplication of fertilizers.

Take the country at large, and fully one-half our agriculturists who attempt to manure, and profess to cultivate twenty acres of land, actually throw away annually in the misapplication, or no application at all, of fertilizers, more money than would pay for all the agricultural journals published in America. It is one of the singular paradoxes of human nature, that a man will refuse to invest a *single dollar* in an agricultural paper that in its information imparted will return him five hundred fold, and then in sheer wantonness absolutely throw away every year a lifetime's subscription to ten such journals.

R. C. KENDALL.

Reisterstown, Md.

The Rotation of Crops, and the Reason.

The practice of agriculture consists of a series of operations, by which we endeavor to raise from the land the most valuable produce it is capable of yielding, with as little cost as possible, and with the least injury to the soil. An ignorant person might manage to draw from the land very heavy crops of corn for a short time, and in doing so he might seriously damage the property. Whereas, another, possessing a practical knowledge of good systems, might succeed in realizing the same value of produce without injuring the character of the land. It has therefore been accepted as an established principle, that a judicious succession of crops is advantageous for aiding the farmer to produce the best crops he can with the least detriment to the land. Experience proves to every observant person, that, under our ordinary practice, the repeated growth of any crop upon the same piece produces a gradual decrease in the quantity which the land is capable of yielding. This takes place more rapidly in some soils and under some crops than others, but the same *fact* stands out in all the light of an accepted truth. Now to what causes can we trace this? The only two changes which the plant can have produced in the soil are the addition of noxious-matter and the abstraction of fertilizing matter. It has been well argued that a plant, during the period of its growth having received from various powers its supplies of food, appropriated for the purposes of its own development such matter as it required, and ejected by its roots, as excrementitious matter, that which was of no further use. It was further believed, that as the soil became more and more fully charged with such excrementitious matter, the growth of the crop became less luxuriant because of the soil being charged with that which was believed not only to be worthless for promoting the plant's growth, but positively injurious. In the case of animals this is observed very plainly; and the peculiar aversion which beasts manifest to their various excrements shows the means which Nature has planted in each to lead them to avoid that which would be, not only useless, but really injurious. This explanation was very generally accepted for many years, and it was a very reasonable mode of explaining the observations of practice. It appeared to be corroborated by the fact that after the soil had been exposed to the air by the process of cultivation, the land became "sweetened," as they termed it, and then was again ready for the production of the same crops; whereas, if the land were kept as much as possible from the atmosphere, then

the crop still failed to be productive. Although this explanation appeared very simple, yet, being destitute of satisfactory proof, it only held this position until its successor came into notice.

The claims of its rival were based upon the exhaustion of the land, and its principles are simple. Every crop removed from the land, takes from it a certain quantity of mineral matter which the land had yielded in its growth. Every successive crop of the same plant having removed similar materials, the proportion of those ingredients of the soil which remained was thus gradually reduced by every crop. If the soil were rich, it could withstand the attack for a longer period of time than if it were poor in quality; and this fact alone leads us to see the cause. If we have a soil rich in the inorganic elements required by the crop, such a soil would bear a longer succession; but, if deficient in these mineral matters, a more speedy failure of the crop is the result.

Should a soil possess some of the ingredients in abundance, whilst others which are essential to the growth of the crop are deficient, the productiveness of the soil will be regulated by the latter. Thus land may be exhausted of certain ingredients which the crop requires, and consequently becomes incapable of producing it in luxuriance, or even in a remunerative degree, whilst it may still possess all the other ingredients in abundance. For crops, therefore, which relied upon those materials yet remaining in the land, it would still be fertile or productive.

This explanation has been very generally accepted as a substitute for the excrementitious principle before named; and there is much truth in the argument based upon the exhaustion of the soil. Still we are far from being disposed to consider this as fully explaining the principles which are embodied in this interesting subject. We must ever remember, that, whilst we seek truth, we must not rest upon a few fragments, although they may be in themselves perfectly correct; that in the functions of vegetable life *many* principles are involved. Let us prize each as we discover them, and await with patience and persevering industry until we have gained those that remain. These will ultimately dovetail in with those we already know, and render the series complete. Whilst, therefore, we cannot consider that the necessity for a judicious succession of crops which will favor the fertility in the land depends solely upon the exhaustion of the mineral ingredients of the soil, yet we are fully justified in stating the fact that it has a powerful influence upon the result, as is worthy of a very careful consideration.

In another page of this magazine we have inserted a table, which will give the reader a clear view of the mineral matter which our crops contain. As the soil is the only source from which these materials can be procured, it will be evident that without a due consideration of these facts, we cannot have safe information to guide us, either as to the best succession of crops, or enable us to compensate the natural deficiency so produced in our soils, by the aid of manures.

There is a remarkable difference in the food required by different crops. For example, our corn crops take from 65 lbs. to 140 lbs. of silica per acre, but other crops from 6 lbs. to 20 lbs.; whilst the root crops make a demand upon the soil for the alkalies (potash and soda) far in excess of that required by the corn. In like manner, we observe other equally important and singular differences in the demands made upon the soil. This variation in some measure explains the adoption of certain rotations, whereby the crops are placed in that order of succession which will distribute the demands as much as possible, instead of allowing them to concentrate too much at any period of the course. It must not be supposed that the credit arising from the adoption of our established rotations belongs to those who have discovered these principles; for such is not the case. Successful practice having given remunerative proof of success, led to such an established order; and afterwards by the assistance of scientific investigators we discovered some of the causes for this method. Practice showed that to obtain success certain crops had to be distributed through the course, and separated from each other, whilst other crops answered well in immediate succession. We have so far drawn attention to the data by which these singular facts can be explained, and shall next more fully elucidate this most interesting branch of rural economy.—*Farmer's Magazine* (*London.*)

An Importation.—We learn from the Alexandria *Gazette* that among the cargo of the New York steamer Monticello, on her last trip to that city, was a Shanghai Ram, five months old, consigned to Mr. Yeaton, of Alexandria, for Mr. Edmund B. DuVal, of this county. One buck and two ewes of this breed, imported from China some time since by Mr. W. H. Wisner, of New York, produced, in nine months of last year, seventeen lambs—not less than four, and sometimes five at a birth. The English stock-raisers, by crossing this breed with the South Downs, have increased its size a full third and improved the mutton.

A Theory for Mr. Baker.

To the Editor of the American Farmer:

DEAR SIR: I cannot see very clearly why our Virginia neighbor of Winchester should "cut loose" from the *Farmer* for no other reason than that the editor thereof cannot, or will not "on compulsion," give him a *satisfactory* reason why planking over, brushing, littering, or in any other manner covering an unproductive soil, should render it fertile. If the question were one that involved practical and general utility, it might become worth while to pursue the investigation of causes to a satisfactory result, by patient experiment. But as the most expensive fertilizers in use are now and always will be cheaper than any shade plan—unless it were possible to command a regular rotation of *night* over our fields—it seems to me the subject were better left to the discussion of chemical *savans*, having an unlimited leisure capital, than to the investigation of practical farmers, whose real interests in these secession-war, revolutionary times, lie altogether in another direction.

Nevertheless, having given the *shade theory*, under its various phases, some considerable attention, and having not the slightest objection to giving our friend Baker, of Winchester, *my* reasons, even under compulsion, I hope to succeed, if not in satisfying him in regard to the *modus operandi* by which nature works out fertility in total darkness, at least that plank manuring is not profitable, or secession from the *Farmer* judicious.

Dr. Baldwin's theory that the earth itself undergoes a chemical change, consequent upon a condition of total darkness and a close, confined atmosphere, will scarcely endure the test of a wider range of observation. I have found in more than a hundred instances, the soil within the *charqueries* of Buenos Ayres, the Banda Oriental and Southern Brazil, rapidly acquiring fertility under conditions radically different from the close-covering process assumed generally, as a necessity of change from sterile to productive habit. These *charqueries*, or beef-houses, are erected for the purpose of curing the immense quantities of jerked beef for which those regions are celebrated, and are so constructed as to totally exclude every ray of light, and at the same time secure the fullest ventilation. As the circulation of air within these beef-houses is constant, and as pure as air may be under any circumstances—so entirely so, that huge flakes of beef are perfectly cured independent of a particle of salt—it is scarcely possible that *putrefaction* can occur in the soil within the buildings. It is evident, however, that Nature's chemistry is at its vigorous work, for within two years from the erection of one of these structures, the surface earth, before barren of the material, becomes so highly impregnated with nitre that a handful of it exposed for a few hours to the sunlight, exhibits its myriad crystalizations of nitrate of potash. Similar results follow in all other cases where the ground is covered, whether closely or otherwise, to the total exclusion of light, as in cellars, under all buildings, in soil covered by boards, litter or any other material, and in a less marked degree, in land densely covered with growing brushwood. Now as nitrate of potash prevents and arrests putrefaction in all organic matter as surely as sunlight absorbs darkness, it would seem that Dr. Baldwin's position is untenable.

Why total darkness is a powerful generator and faithful depositor of nitrate of potash in the soil, is a mystery that a greater than Liebig must one day solve; but that nitrogen, which constitutes seventy-nine one-hundredths of the air we breathe, is as necessary to plant growth as it is to animal life we all know, and that this constituent of vegetable vitality has been precipitated and forced into combination with other elements lying inert in the soil, by the agency of *darkness* is equally certain.

But this chemical combination and deposite is only the *avant courier* of a more powerful fertilizing agent that works exclusively under the cover of total darkness. This is the common earth-worm. These industrious manipulators of the soil shun sunshine and the broad glare of day as Satan does the sanctuary; but give them a dark corner, a shaded nook, the cover of a flat stone, a plank, or heap of rubbish, and their labor is incessant, indefatigable, and most efficient as a fertilizing agent. Cover over a bit of sterile earth with a plank, so as to exclude the light and insure moisture, and within a month there is a manifestation of the presence of nitre where the closest chemical test could have detected none before. Within another month comes the army of subterranean sappers and miners, boring the whole surface soil to the depth of a foot, into millions of holes, passing every particle of it through their long, flexible organism, and leaving in their excrete a compost beyond the power of human skill to equal. Under the administration of these wonderful workers in darkness, in the space of two years, the hard-packed, sterile ground has been as thoroughly cut up as ever was an unpainted, wooden-bottomed ship by the *terredo* after three months of

inactivity in the waters of Tampa Bay. By the agency and industry of these wriggling atomatic Jethro Tulls, the whole organic structure of the darkened surface has been changed both in quality and complexion. From a pale, barren and baked *hard pan*, it has become a light, porous, dark-colored *soil*, rich in all the elements of vegetable life.

Such is my version of the *shade theory*, but whether it will prove satisfactory to our Winchester *secessionist upon condition*, remains to be seen. However that may be, I would not advise him or any other farmer to adopt the *plank* system of fertilizing until pine timber rules considerably lower in the market than guano and superphosphates, until the application and removal can be made at an equal cost, and they can afford to wait two or three years for a proper amount of fertility to be *wormed* into the soil.

With regard to the *secession* menace of our neighbor over there in the Southern Confederacy, he will find upon reflection, if he has been long a subscriber to the "*old Farmer*," that it is an institution not so easy to "cut loose" from. Old friends, old habits and associations, are not so lightly thrown off. I have no idea that our Virginia neighbor had a serious thought of such a thing; but supposing he had, would he willingly forego the benefit proffered through the medium of the *Farmer* from such intellects as those of David Stewart, M. D., Dr. Pendleton, J. Jacob Bower, John Johnston, the *Farmer's* Editor himself, and a host of others, embracing the best agricultural talent in the country? If he *could* do this, I am disposed to argue that in consideration of the indispensable instructions given monthly, for the management of the kitchen garden, the fruit department, the parterre and the green house, there would be an earnest protest entered against secession by Mrs. Baker and the Misses Baker, if such feminine advocates of the *utile dulce*, our neighbor on the other side of the Potomac is blessed with.

R. C. KENDALL.

Reisterstown, Md.

Hay-Making.

It has been held to be a good rule in regard to clover, to cut it when the greatest bulk is in full bloom, which would generally be after a portion of the heads had turned brown. But rank clover is apt to lodge, and when it once gets down so that the leaves at the bottom die and fall off, the crop gains nothing. It may not be an object to pick out here and there small spots that are down, but where any considerable extent of the crop is in this condition, it is advisable to cut it at once. If the crop is heavy, and it remains long on the ground, it will be likely to smother the life out of the roots, so that little or no clover grows afterwards. Hence we may say that where either grass or clover are much lodged, the sooner the crop is cut the better.—*Ex.*

Much has been written about the proper time to cut grass. That a stalk is worth more—or contains more nutriment—at the time it is in blossom, we have no doubt; but it does not follow from this that it is best to cut every piece of grass when it is in this stage. In some sections—as in the western part of Vermont, along Lake Champlain—a considerable extent of ground is mowed which is set in a great degree to the *Poa pratensis*, Kentucky blue-grass, June-grass of some sections. This species throws up its seed-stalk early in the season, and if the weather is dry, the stalks are scattering, running to seed and dying before there is much bottom growth. If the crop was cut while it was in blossom, there would in many instances be but precious little of it, but where the land is strong, we have seen a pretty good crop of blades come up from the effect of June or July rains. Of course, by waiting for this, three or four times as much hay was obtained as if the crop had been cut when in blossom. It may be said that whatever did blossom might have been cut in that stage, and the second growth taken at a second cutting; but there would not have been enough of the first to make it an object. Such cases, however, are not common, and do not invalidate the rule that the grass crop, generally, should be cut before the seed is formed.

As to the modes of making hay, we have heretofore shown that clover is much better when cured in cock. The arguments in favor of this mode are considerably strengthened since hay-caps came into use. They keep off the rain, while they allow the hay to remain so light that the process of curing may go on—the sap of the stems being expelled by *sweating*, as it is called, and the air carrying off the moisture, more or less.

The grasses are not so readily made into hay without exposure to the sun; but they may be dried too much. It is not likely that grass in blossom would suffer any injury from all the sunshine it might have the day it was cut; but it would be better to cock it up before night, and if it is protected from wet by caps, the close-observing farmer can tell the amount of drying that it will afterwards need.—*Ex.*

"Shallow Ploughing—The Great Error of American Agriculture."

[Continued from May number.]

"Hitherto I have treated of the beneficial effects to be derived from *deep tillage abstractedly*, and no further than abundant corroborating proofs will substantiate; but believing as I do, that if ever a material reformation takes place in *American agriculture*, that this will be the *basis*, I am induced to offer a few hints for consideration respecting the probable advantages that may be derived from the practice, when combined with other necessary improvements, such as a due attention to manures, rotation of crops, &c., &c.

By a proper attention to these things may we not reasonably hope for the speedy fertilization of thousands of acres of exhausted old fields, that now will not pay for enclosing? To effect which I would propose, that the *system* by which they have been reduced to their present state of *poverty*, be in all points *reversed*. They have been reduced by SHALLOW PLOUGHING, an *ill-chosen* rotation of crops and a total neglect of *manure*. Let them be recruited by DEEP PLOUGHING, a *favorable rotation, and all the manure* which the best management will afford them. My plan would be this: break up the ground in the fall, ploughing at least eight inches deep; if level, throw it into ridges; if hilly, begin at the base and surround the hill, if the situation will admit; if not, turn a furrow down the hill and let the plough return light; for if the furrows are attempted to be turned against the hill, it will not be effectually done, and the whole business will be thereby marred. In the spring, plough and harrow as often as convenient, or the state of the ground seems to require, always keeping to the same depth. If a sufficient quantity of manure is in readiness, the last ploughing should turn in from twenty-five to thirty large cart-loads per acre; then plant with potatoes; after they are dug in the fall, either sow down in wheat, and early in the spring red clover-seed, or let it lie over winter, and sow in the spring barley or oats and clover.

If manure cannot be procured the first spring, let not the industrious improver be discouraged; but instead of potatoes, substitute some *shading crop*, that does not require so much strength of soil, such as peas, beans or buckwheat. I have no doubt that if the foregoing instructions are attended to, on ground that has ever been tolerable, that one or other of these crops may be cultivated to profit. This will also better prepare the ground for the next year's operations, by which time it is presumed the cultivator will be furnished with manure to proceed as before mentioned. In planting potatoes on hilly ground, or any other crop set in rows, and requiring to be ploughed or hoed whilst growing, more attention should be paid to the rows being horizontal, than in straight lines, as being more favorable to derive advantage from hasty showers, and also to prevent washing. In most situations and soils it will be found that the clover will be much improved by the use of plaster of Paris as a top-dressing, and ought not to be neglected when it can be procured.

If by these means a good swarth of clover is produced, I consider the land as reclaimed; for I know of no better preparation for a crop of wheat than a clover-lay well turned, after being mowed two years; the wheat sown on the ploughing and harrowed in.

Lands once reclaimed by these means, will by a similar course of management, that is, by *deep cultivation*, a *well chosen rotation*, and *manuring* as often as practicable, be kept in fine tilth with much *less labor* than in the present mode. May we not then expect by a proper attention to these interesting considerations, great improvements in the cultivation of Indian corn, tobacco, potatoes, peas, beans, &c.? We have found by experience that these crops particularly, require the soil to be kept open and clear of weeds during their growth; in order to effect these purposes, the common practice with respect to corn is, to plough and cross plough frequently, three or four inches deep, until about the time of tasseling or blossoming; in addition to which many hill several times, and nearly all once at least. The other crops are mostly ploughed, and almost universally hilled. But provided we can attain these ends (viz: the destruction of weeds and an open soil) by other means, are those practices rational? Any one who will be at the pains to search, may easily discover that the roots of corn soon extend themselves a considerable distance from the hill; by the time the top is knee high the roots are extended nearly from row to row, (if not too frequently cut off by the plough,) though so small as to be scarcely visible. Is there any good reason to suppose that nature requires those numerous organs, prepared for the express purpose of supplying the rising plant with sufficient nourishment, to be so frequently mutilated, as must always happen in ploughing? thereby not only depriving the plant of that quantum of supply contained in the amputated vessels, but also of all future supplies by the same sources.

True it is, that above ground we frequently

find it necessary apparently to oppose the operations of nature in some measure, in order to bring her to act more consistently with our views.—For instance, fruit trees and many kinds of plants that bear their fruit upwards, often project so many branches and suckers, that notwithstanding the fruit may be thereby increased in number, yet we find it necessary to lop off a part, in order that the whole of the nutriment may be applied to the remainder; improving the quality and frequently increasing the quantity thereby. But that it is necessary to diminish the roots that supply the nutriment, I believe has never been proved by any experiment.

Yet nevertheless, we constantly see the good effects of frequent ploughings; the reason is obvious: in the common mode the ground becomes too solid in a few weeks, sometimes in a few days, for the roots to penetrate, and therefore it is better for the plant, when all its vessels of supply are embargoed, to part with one-half, if thereby admittance is obtained for the other half to act freely. So that it may be fairly said, in the cultivation of Indian corn, of *two evils* we choose the *least*. The important question is, how shall we avoid *both?* May I not answer, by attending to the foregoing instructions?

A suitable rotation, and the necessary preparation of the ground before planting, will so far clear it of weeds that one or two ploughings and as many harrowings afterwards will complete that business; all which may be done by the middle of the sixth month, without material injury to the roots, as the corn at that time is seldom more than a foot in height. If these ploughings are of the depth before mentioned, there will not be the least danger of the soil becoming compact for a few weeks, until the growth is so much increased as almost completely to shade it; after which it will need no ploughing to keep it open. This effect will generally take place in this State about the middle of the seventh month, for it is to be remembered that in this mode, it may be planted much closer than in the common way; the number of plants not being estimated so much from the surface as from the quantum of soil employed, as before hinted; for instance, if one plant requires a yard square of soil, of three and a half inches depth, the same surface will be more certain to bring to perfection two plants, when worked seven inches deep; experience having proved, that in some particular rich deep soils, corn will admit of being planted four times closer than is usual, without suffering from a want of air. Thus it is probable, nay experience has already reduced it to a certainty, that *half the ploughings* usually given to corn may be made to produce *double the quantity* on the *same ground*. What an immense saving of labor!—What an immense saving of land!"

Valuable Recipes.

No. 1. *Blackberry Wine.*—To make a wine equal in value to Port, take ripe blackberries or dewberries, press the juice from them, let stand thirty-six hours to ferment, lightly covered, skim off whatever rises to the top; then to every gallon of the juice add one quart of water and three pounds of sugar, (brown will do,) let it stand in an open vessel for twenty-four hours, skim and strain it, then barrel it, let it stand eight or nine months, when it should be racked off and bottled and corked close—age improves it. *Probatum est.*

P. S.—By omitting the water and sugar would it not be nearer Port wine? Try it.

No. 2. *Blackberry Cordial.*—To three pounds of ripe blackberries add one pound of white sugar; let them stand twelve hours, then press out the juice and strain it; add one-third of good spirits; to every quart add one teaspoonful of finely powdered allspice. It is at once *fit* for use. Our native grape makes the best of wine, and is easily made.

No. 3.—Take any quantity of sound, ripe grapes, with a common cider-press press out the juice, put it into barrels, cover the bung lightly; after fermentation has ceased cork it; place it in a cellar or house. In twelve months you will have good wine, and improves by age—let it stand on its lees.

No. 4.—For preserving fruits of any kind, with all their delicious flavor and taste, select fruit that is ripe, (not too ripe,) brush or wipe off all dust, &c., have ready stone or porcelain jars, (by no means use metallic jars,) cover the bottom of the jars with good brown sugar, then put in a layer of fruit, fill the crevices and cover the fruit with sugar, then another layer of fruit, and so on until the jar is full, the last layer to be sugar. Take good brown paper and paste pieces over the mouth of the jars; when nearly dry paste on another piece of paper, and so continue until a good, thick pasteboard is formed, which is air-tight, and better than any self-sealing metallic cans or jars, and no danger of being poisoned from metallic oxydes; this will keep for many years. Delicate, soft and tender fruits, such as berries, &c., should be put into small jars, as the weight would mash them.—*American Cotton Planter.*

Interesting Facts—Analogy of Plant Life to Animal Life.

The functions of animals and plants are in a like degree analogous. Animals take in their food by the agency of the mouth, and prepare it for digestion, either by various degrees of mastication, or by attrition, as in the gizzards of birds. In this they differ from plants; but these have a sufficient compensation, in as much as they imbibe their food in a fluid form, liquid or æriform, and consequently in a state already of the finest possible division. Animal and vegetable remains are their common food, and salts of various kinds are their condiments and stimulants; plants have this advantage over animals, that as they absorb only the soluble and finer parts of their nutriments, and their absorbing organs have the power of rejecting that which is offensive, they have no offensive matters to separate, such as appear in the excrements of animals.

In the animal stomach the food undergoes an extensive change, being reduced to a pulp of greater specific gravity, and being altered entirely both in taste and odor. In the sap vessels of plants, which may be truly considered as their primary organs of digestion, their food or sap undergoes a change precisely similar; its color and flavor are altered, and its specific gravity increased.

From its stomach the animal's food passes into the intestines, is there subjected to the action of the bile, and the chyle or nutritive portion is separated from that which is excrementitious.—In its passage through the intestines, the chyle is absorbed by the lacteal vessels, and conveyed into the blood; and these mingled liquids are propelled by the heart into the lungs, and there exposed to the action of the air. The vital liquid now changes its purple hue to a florid red, loses a portion of its carbon and watery particles, the former combining with the oxygen of the atmospheric air in the lungs, and being breathed forth in the form of carbonic acid gas. As plants take in as food no gross unneeded ingredients, it is obvious that no process like the biliary operation is required in their course of digestion. But in them the food or sap, proceeding at once along the branches, is poured into the leaves, which are the very lungs of the vegetable world. Here, as is the blood, its color is changed, and oxygen emitted from it during the light hours of the twenty-four; but carbonic acid is breathed forth during the night, and, at all periods, a considerable amount of watery vapor is emitted.

From the lungs, by the agency of the heart, the blood is propelled through the arteries over the whole animal frame, supplying nourishment and warmth to all the parts, and where, by those being abstracted, it is again converted into purple or venous blood, and is returned by the veins to undergo a repetition of those changes already noted as being effected in the lungs. In plants the sap, after exposure to the action of the air in their leaves, is returned by another set of vessels, situated in the bark, ministering to the growth and support of the plant. It is true, that only under certain circumstances, detailed in another chapter, is heat evolved during the processes of vegetation; but the circulation of the sap in plants, beyond all doubt, enables them to resist the intense colds and heats of their native climates. In frosts, the most intense and prolonged, we find the interior of trees remain unfrozen; and, under the meridian sun of the tropics, the sap of the palm and of all other trees retains coolness. This power to resist extremely elevated and depressed temperatures is characteristic of all animated nature.

Such is the close similarity in the digestive and circulatory process characterising the members of the two great kingdoms of organized nature, a resemblance which obtains in all the other functions enjoyed by them in common. During respiration, the air inhaled by animals through the mouth and nostrils proceeds immediately to the lungs, and acts upon the blood; in plants, the air inhaled by their leaves operates instantaneously upon the sap. Oxygen is the vital air of animals, so that gas and carbonic acid gas are equally essential to plants. If animals be placed in a situation where they inhale pure oxygen, their functions are highly excited and increased in rapidity; but it is an exhileration speedily terminating in exhaustion and death, if the inhalation be continued for a protracted time. So plants will nourish with increased vigor in an atmosphere containing one-twelfth of carbonic acid, but even this brings on premature decay; and if it exceeds that proportion, destruction is still more rapidly induced. During sleep, animals exhale less carbonic acid than during their waking hours, so plants emit a much diminished amount of oxygen during the night.

We might now proceed to enumerate the facts demonstrative that plants are gifted with sensation, if these had not already been stated when considering how salts affect plants. In addition to those facts we will only observe, that plants are obviously stimulated by light. Everybody must have observed that they bend towards the point whence its brightest influence proceeds.—M. Bonnot, the French botanist, demonstrated

this by some very satisfactory experiments, in which plants, growing in a dark cellar, all extend themselves towards the same small orifice admitting a few illuminating rays.

Almost every flower has a particular degree of light requisite for its full expansion. The blossoms of the pea and other papilionaceous plants, spread out their wings in fine weather, to admit the solar rays, and again close them at the approach of night. Plants requiring powerful stimulants do not expand their flower until noon, whilst some would be destroyed if compelled to open in the meridian sun—of such is the night-blooming Cereus, the flowers of which speedily droop, even if exposed to the blaze of light attendant on Indian festivities.

From these and other facts incidentally mentioned in preceding chapters, and others which will be stated when considering the health of plants, without believing that they demonstrate sensation to exist in plants as acute as that possessed by the superior or more perfect classes of animals, yet they certainly are satisfactory evidence that some plants possess it to a degree nearly as high as that which the zoophytes, or even the polypus and leech, are gifted. Some of these animals may be cut into pieces, and a third class of them may be turned with their insides outwards, without any apparent inconvenience. If plants be endowed with no more or even less sensation than must be that of such animals as these, it explains the causes, and throws light upon the prevention of many diseases affecting those which we cultivate, and warns the cultivator from the late performance of many of his operations, as well as from being needlessly violent in his treatment. If a grape vine be pruned too late in the spring, the bleeding or effusion of sap has been known to be so excessive that the vine has died from absolute exhaustion. Stone-fruit trees, if severely bruised, are frequently destroyed by the inroads of a disease resembling, in all its characteristics, the cancerous affection of animals; and we have known a whole crop of wheat affected with a swelling of the stem or culm, evidently caused by an extravasation of the sap from its ruptured vessels, owing to a heavy roller being passed over the crop, when of a forward growth.—J., *in Cottage Gardener*.

How Much Lime.—John Johnston says: "I only put 40 to 50 bushels unslaked lime to the acre in my early liming. Latterly I have put as much as 80 to 100 bushels, and I believe that pays best. Lime on such soils as mine will improve the crops for 15 or 20 years, if the land is not cropped with grain continually."

Bad Effects of Grass on Colts.

When horses are turned out to grass in the spring of the year, the succulent nature of the food causes them to purge, often to a great extent; this is considered by many persons a most desirable event—a great misconception. The herbage is overcharged with moisture and sap, of a crude, acrimonious nature, to such an extent that all cannot be taken up by the organs destined for the secretion of urine, or by the absorbent vessels of the body; the superfluous fluid, therefore, passes off through the intestines with the indigestible particles of food, and thus the watery fæces are thrown off. Flatulent cholic or gripes is a frequent attendant. The system is deranged; but the mischief does not terminate here. If the purging is continued, a constitutional relaxation of the bowels is established, very debilitating to the animal, and often difficult to control. I am so decidedly opposed to unrestricted allowance of luxuriant grass to horses at any age, that nothing could induce me to give it to them. After the second year, hay should form a considerable portion of the daily food in summer to every animal intended for hunting or riding.

If a horse is supported entirely upon the grass which he collects in a rich pasture field, or upon that which may be cut and carried to him in his paddock, he must consume a much greater bulk than of hay in an equivalent time, to afford nourishment to the system. Grass being very full of sap and moisture, it is very rapidly digested, consequently the horse must be continually eating it. This distends the stomach and bowels, and the faculty of digestion is impaired, for the digestive powers require rest as well as other organs of the body, if they are to be preserved in perfect condition. By the custom of grazing, the muscular system is enfeebled, and fat is substituted. This may escape the notice of the superficial observers, who do not mark the distinction between the appearance of a fat and a muscular animal, who conceive, so that the bones are covered and the points are rounded, all that is requisite has been attained. But that is a very fallacious impression. Let any person who is skeptical on this point ride a horse in the summer who has just been taken from grass, along with another kept on hay and corn, at the moderate rate of seven or eight miles an hour; the grass-fed horse will sweat profusely, while the other will be perfectly dry. This proves that the one eating grass overbounds with fat and those portions of the blood which are destined to form that deposit.

Those who will advocate grazing will no doubt exclaim, "Oh, this is a test of condition, which is not required in young and growing animals." I beg to state that it is highly important, if the acme of condition is to be attained by animals of mature age, that the growth and gradual development of their frames should be composed of those healthy and vigorous elements upon which the structure of future condition can be raised. Animal substances are, to a very great extent, subservient to the nature and quality of the food with which the individuals are nourished. I believe farmers would find it much to their advantage if they were to consider this subject with reference to feeding cattle and sheep, so that they might select those kinds of food which abound with properties more conducive to the production of flesh than fat. There is no kind of food which the horse consumes which has not a tendency to deposit fat. It is a substance which must exist to a certain extent; but as it is muscular power, not a predisposition to adipose rotundity, which enhances the value of the animal, the reasons are obvious what guide should be taken in the selection of food.

I have on a former occasion hinted the propriety of bruising the oats, and I will now state my reasons for so doing. The first I will mention is economy. Three bushels of oats which have undergone that process are equivalent to four which have not, and the animals that consume them derive greater benefit. Various schemes are adopted to induce horses to masticate their corn, all of which are ineffectual. Scattering them thinly over the surface of a spacious manger, mixing a handful of cut straw with each feed, and such like devices, will not cajole the animal to the performance of mastication. A horse that is disposed to bolt his corn, however carefully it may be spread along his manger, will soon learn to drive it into a heap with his nose, and collect as much with his lips as he thinks fit before he begins to masticate. Whatever food enters the stomach of any animal, and passes away in an indigested form, may be considered as so much dross or extraneous matter, which, not having afforded nutriment, is prejudicial to the creature which consumed it. A mistaken notion of economy is often the incentive to turning horses out in summer, to be entirely dependent upon grass for their support. A few remarks will surely dispel that error. Twenty-two bushels of oats—allowing one bushel per week from the 15th of May to the 16th of October—may be as the produce of half an acre of land, and half a ton of hay that of another half acre, although a ton and a half per acre is not more than an average crop. It requires at least an acre of grass land to support a horse during the period above mentioned.—*Mark Lane Express.*

What Do We Plough For?

Such was one of the questions suggested as an appropriate subject for a prize essay. It is a question of considerable importance, and called out twelve essays. One of them was awarded the prize, and published in the February number, page 52. The other eleven essays are before us, and it will not be uninteresting to glance at some of the principal reasons assigned for this fundamental agricultural operation.

1. We plough to bury the weeds, grass, and other vegetation.

2. We plough to loosen and pulverize the land. All soils, but especially those of a clayey nature, have a tendency to consolidate, and soon become too firm and compact for the tender, hair-like roots of young plants to enter. The soil may contain all the plant-food required, but if it is so hard that the roots can not penetrate, it will be of no avail. It is locked up. Ploughing is the key that unlocks the storehouse. The plough is inferior to the spade, because it does not break up and pulverize the soil so thoroughly. If we had a digging-machine that could be worked by horses or steam, as we undoubtedly shall have before many years, it would soon supersede the plough.

3. We plough to let in the sun and air. In nearly all soils there is a large amount of inert organic matter which could be rendered available plant-food by fermentation or decomposition. This is accelerated by the admission of air. Like water, air will penetrate all porous bodies. Large lumps of sugar are long is dissolving, because the water has access only to the outside; but crush it and let the water get at all its particles, and they are dissolved with great rapidity. So of the soil, if it is in lumps, the air cannot get at it, but loosen it and render it porous by ploughing, harrowing, rolling, &c., and the air will be brought in contact with the particles of organic matter, and decompose them. It will also disintegrate the inorganic matter of the soil, and render more or less of it available as food for plants. It must not be forgotten, too, that the roots of plants need air.

The air contains ammonia and carbonic acid, and it is a well known fact that porous bodies will attract these gases. Thus Theodore de Saussure found that charcoal heated to redness and plunged while hot into mercury, and after-

ward, when cold, without being exposed to the atmosphere, plunged into ammoniacal gas, *absorbed ammonia equal to ninety times its volume.* That is to say, a cubic foot of charcoal would absorb one hundred pounds of ammonia, or as much as ten tons of ordinary barn-yard manure contains. The power of fresh charcoal for absorbing and condensing ammonia is due to its porosity. Spongy or porous platinum will absorb so much hydrogen gas that the heat evolved by its condensation will ignite it. Now, while a porous soil possesses no such power, there can be little doubt that it does absorb ammonia and other gases by the mere attraction which one particle of matter has for another. This power is in proportion to the amount of *surface* exposed to the air, and consequently the more the soil is comminuted, the more it is broken up and loosened, the greater will be its power of attraction.

Most soils also, contain substances which have a *chemical affinity* for ammonia. Professor Way says:

"I find that clay is so greedy of ammonia that, if air charged with carbonate ammonia, so as to be highly pungent, is passed through a tube filled with fragments of dry clay, *every particle of the gas* (ammonia) *is arrested.*"

This power of clay to absorb ammonia from the air is ascribed by Professor Way to the presence of a *double silicate of lime and alumina*, and he thinks one reason of the benefit of the application of lime is the formation of this double silicate. Of course, the more such soils are stirred, the more their particles are exposed to the air, the more ammonia can they absorb from the atmosphere. This power of soils to attract ammonia from the atmosphere is one principal cause of the well known benefit of summer fallowing.

4. We plough to incorporate manure with the soil. The more thoroughly this is done the better. The carbonic acid generated by the decomposition of humus has a good effect in disintegrating the mineral matter in the soil. The soil may be regarded as a *stomach* in which the food of plants is digested and rendered assimilable. It is important, therefore, that the manure should be well mixed with the soil.

5. We plough (in the fall) to expose the soil to the pulverizing action of the frost in winter; to disturb the eggs and larva of insects and expose them to the cold.—*Geneses Farmer.*

If the memory is weak do not overload it.—Charge it only with the most useful and solid matters.—*Ex.*

Profits of the Dairy.

To those who contemplate going into the dairy business, with a view to the improvement of their land, the questions as to the relative profits of milk and butter, and the most economical mode of disposing of the manure, are very important.

In order to enlighten your readers on this subject, I cannot do better than give a description of the dairy fixtures of one of my neighbors, who sells milk in the Philadelphia market. His stock consists of thirty-six cows, which enable him to milk thirty during the whole year. The stable has two rows of stalls, four feet wide, and fifteen in a row, with an entry between them, from which they are fed. It also contains a loft where straw, fodder, and other dry feed is kept. The floor is made of slats, through which the manure falls into a trench four feet deep. By this plan less bedding is required, and the cows are kept dry. They are milked in the stall at all seasons, as the labor can be performed in half the time required in the yards. In winter they are kept up most of the time, being let out to water twice a day. Cut straw or fodder, bran and meal, wet and steamed, is given them three times a day, say 1½ pecks at a meal, costing six cents extra for their board. The average yield of milk for half of the year, commencing with October, is about 140 quarts. From this time to April in previous years, the price has been four cents a quart. The balance of the year the average is about 160 quarts, and three cents a quart—thus making an annual daily product of 150 quarts, at 3½ cents for 365 days:

This amounts to	$1,916 25
Extra feed for 5½ months	300 00
Annual cost of labor about	250 00
Profits	1,366 25

We will assume that the expenses of feed, and quantity of milk in a butter dairy, are similar to the above. Our best dairymen tell us that it takes not less than fourteen quarts of milk to make a pound of butter, and that skim milk is not worth over one cent per quart for hog feed. Dividing the yearly product of milk by fourteen gives 3,910 pounds butter.

At 25 cts. it would be	$977 50
52,795 qts. skim milk at 1 cent per qt	527 95
Total	$1,505 55
Feed 5½ mos. $300, aggregate expense	700 00
Profits of butter	$805 55
Profits of milk	1,366 25
Difference	560 70

In this calculation I have omitted 1,955 quarts of skim milk, being an allowance of a pint to

the pound of butter. The estimated expenses of the butter dairy are very moderate, as many would consider them double those of milk.

By the above it will be seen that in the first instance we are getting about 50 cents for our 14 quarts of milk, and in the second, (allowing 25 cents for butter and 13½ for skimmed and butter-milk,) about 39 cents.

In order then to make them equally profitable, we must realize 36 cents a pound for the butter the entire year. It is a very difficult matter to dispose of butter in this locality at 25 cents the year round.

The freight on milk by railroad this distance from the city would quadruple that of butter, and hence we must deduct about four cents for transporting the fourteen quarts of milk to market. Strictly speaking, it would stand, butter and skim milk, 38; value of new milk, 46.—Thus showing a difference of four or five hundred dollars per annum in favor of the milk business.

It will be seen that we feed away $527 worth of milk to hogs in the one case, and this would buy nearly 900 bushels of corn at 60 cents per bushel. Can any one tell which would make the most pork? I would prefer 500 bushels corn to the 52,795 quarts milk. The value of manure will next be considered.—*Ger. Telegraph.*

Items for Amateur Gardeners.

When watering, particularly newly planted crops, in dry weather, give a good soaking of water at the roots, and in all *mild* weather sprinkle over the whole plant at the same time, to prevent excessive evaporation.

Liquid manure for growing vegetable crops may be given twice each week, and for developing flowers as soon as the calyx or flower cup begins to burst, it should be applied but once a week. A cloudy atmosphere is the best condition for giving water, and early in the evening the best period in summer months.

The liquid which soaks from common farm and poultry yards, with some soot added, is the cheapest, but where such is not procurable, add 1 lb. of guano to 30 gallons of water, and about a spadeful of soot, the latter tied up in a coarse cloth or bag, to prevent it from swimming on the surface of the water. This mixture will make a liquid manure fit for all the ornamental gross feeding plants, as Pelargoniums, Salvias, Fuschias, Calceolarias, Achimenes, etc. To prevent drawing off, or using the water in a turbid state, drain it off as clear as possible. The soot is an essential ingredient as a manure, and as an antidote to insects.

Soft Water.—Where rain or soft water is not procurable for watering plants, it should be known that caustic lime is a useful element in reducing its hardness. The proportions are, one of lime to five of common water, which reduces the hardness of water to the same degree as that of water after being boiled; or, 1 lb. of chalk calcined will produce 9 oz. of caustic lime, which will make forty gallons of lime-water, and be sufficient to mix with 560 gallons of ordinary water.

Bone Dust, mixed with dry-sifted loam or soil, and sown thickly broadcast, (with after rolling,) forms an excellent ingredient in restoring and quickening the verdure of decaying grass-plots in gardens, pleasure-grounds, etc.

Mixing a small portion of pure bone dust in the soil in which various plants have been grown, has proved very beneficial, and caused them to produce stronger and more healthy growth. The effect is particularly noticed in plants of slender, delicate habit. By thus enriching the soil it was proved that plants thrived more in smaller pots than usual, and did not apparently suffer in the same degree for want of shifting to larger pots. As a fertilizing agent (in due proportions) it appears to be applicable to a greater variety of plants than almost any other yet noticed, by acting as a mechanical agent, adding a greater porosity to the soil by slower decomposition.

Guano Water.—One pound of Peruvian guano to 20 gallons of water will be sufficiently strong for a single watering to plants or vines each week, and more efficient than repeated waterings with weaker solutions.

Surface Mulching, with manure or enriched soil, is of great advantage, and essential for ensuring good crops on poor soils.

Surface Hoeing among all crops should, for it benefits, be uniformly attended to, in admitting the free action of the atmospherical agencies of light, heat, etc., upon vegetation, and without which, in a proportionate degree, plants will not expand, nor fruits ripen.

Cleanliness from all weeds and rubbish should be considered an essential among growing vegetable crops in the kitchen garden, as among the more fragile productions of the flower garden. In both cases, every green leaf of a weed or intruding plant is abstracting the "life-blood" of the soil both from the present and following crop.

Rest.—Directly the crops are off, trench and ridge the ground well up. Turn over all spare ground to the action of the air, etc.—*Ex.*

Meteorological Observations *kept at Schellman Hills, Carroll Co., Md., Sykesville P. O.,* APRIL, 1861. (*Reported for the American Farmer.*)

Day	THERMOMETER.				WIND.			RAIN	REMARKS.
	7 A. M.	2 P. M.	9 P. M.	D'y Mean.	7 A. M.	2 P. M.	9 P. M.	Inch's	
1	35	36	40	33½	E.	E.	S.E.	½	Cloudy; 11 A. M. snow; 12 noon rain, end du-
2	39	48	36	41	N.W.	W.	W.	.....	Clear. [ring night.
3	34	50	45	43	N.E.	E.	N.E.	¼	Clear; 8½ P. M. rain, end in the night.
4	36	50	35	37	E.	N.E.	W.	.....	Cloudy; clear.
5	37	58	49	48	N.	N.	N.	.....	Clear; heavy frost.
6	45	55	43	47½	E.	S.E.	E.	.....	Cloudy; clear.
7	38	45	40	41	E	S.E.	S.E.	.....	Cloudy; 10 A. M. fine drizzling rain all day.
8	40	46	38	41½	E.	E.	N.E.	¾	Rain; end 10 A. M.
9	40	45	38	41	N.E.	N.E.	N.E.	.....	Cloudy.
10	36	55	45	45½	N.E.	N.E.	N.E.	1¼	Cloudy; 8 A. M. rain, end 12 noon.
11	40	60	45	49	N.W.	S.	S.	.....	Clear.
12	46	63	55	54⅝	S.E.	S.E.	S.E.	¼	Cloudy; 3 P. M. rain, 6 P. M. rained very hard.
13	58	67	53	59½	S.E.	N.W.	W.	1¼	Rain; clear; 8½ P. M. rain, end 9½ P. M.
14	54	57	50	53⅝	W.	W.	W.	.....	Clear.
15	48	50	39	45⅝	N.W.	N.	N.E.	.....	Clear; 12 noon rain.
16	40	43	38	40½	N.E.	N.E.	N.W.	1¼	Rain; end 10 A. M.; cloudy.
17	38	45	40	44½	W.	W.	W.	.....	Clear; cloudy; strawberries in bloom.
18	41	60	53	51½	S.W.	S.W.	N.W.	.....	Clear.
19	48	53	40	47	W.	W.	W.	.....	Cloudy; clear.
20	40	50	45	45	W.	W.	S W.	.....	Clear.
21	45	66	55	55½	S.	S	S.	.....	Clear; chimney swallows arrived.
22	63	80	70	71	S.W.	S.E.	S.E.	.....	Clear; wrens and whipporwills arrived.
23	65	83	68	72	S.	S.W.	S.E.	.....	Clear; plum trees and tulips in bloom.
24	66	80	57	67⅝	S.W.	S.	W.	¼	Clear; 3 P. M. gust, lasted half hour.
25	60	70	55	61⅝	W.	W.	W.	.....	Clear; king bird (bee martin) arrived.
26	57	74	60	63⅝	N.W.	S.E.	E.	.....	Clear.
27	57	78	70	68½	W.	S.	S.	.....	Cloudy; clear.
28	65	57	50	57	S.	W.	W.	.....	Clear.
29	58	70	60	63	W.	W.	E.	.....	Clear.
30	60	54	50	54⅝	S.	N.W.	W.	.....	Clear.
..	..	..	..	....	....	....	....	.....	

Monthly Mean, 51⅛. 6 inches Water fell.

HARRIET M. BAER.

Feeding the Farm Horse.

In submitting a few thoughts upon this subject, I shall assume that the horse is to be fed in the grain-growing portion of the United States, and hence confine my remarks to such locality.

In ascertaining the most economical mode of feeding the farm horse, we will premise that that food which is procured with the smallest amount of labor and capital, and adds most to the strength, health and condition of the horse is the most economical. If the horse be kept in actual service and labor, cut oats and corn in the cob, with hay, constitute a cheap, healthy, and strengthening food, and I have no doubt is the most economical method of feeding ordinarily. Oats should always be cut up—cut for the horse to the band, and you will leave a portion in fine condition to be fed to cattle. Three bundles thus cut constitute a good feed, with eight ears of corn and hay; and if hay is not convenient, by letting the horse run out at night and pick grass, or such rough fodder as is fed to cattle, he will keep in fine flesh and extra condition. The low price of horse feed would not pay for labor bestowed upon it unless it be in time of great scarcity of food. The food of horses, however, should be varied, so as to prevent cloying, but oats are extremely agreeable to the horse, and he rarely, if ever, cloys upon them. Cut straw of oats, wheat, or rye made wet, and rye meal mixed with it by pouring in the meal and constantly stirring the straw, makes a fine feed as an alterative, but should not be fed freely to any breeding animal. Such feed acts finely upon the bowels and skin, and may be used to advantage in all cases of costiveness. But one of the most palatable and healthy feeds for the horse, especially if he be failing in his appetite, is a small quantity of shelled oats, say a quart for a horse in delicate health, or a gallon for a horse inclined to costive habits, placed in a pail, with warm water poured over them (or it may be boiling) and suffered to stand and absorb the water, and given when cool. Take care to pour only so much water as to wet the oats moderately. Any horse that will eat at all will eat it. Its action upon the bowels will be fine, which will be told by the sleek and healthy appearance of the horse. —*Louisville Journal.*

☞ A domestic receipt for extracting ink spots from colored articles of linen, wool and similar fabric, is simply to rinse the part so stained in fresh milk, changing the milk as often as necessary until the stain disappears. As a finale, wash out the milk in pure rain water.—*Ex.*

The American Farmer.

Baltimore, June 1, 1861.

TERMS OF THE AMERICAN FARMER.

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N. B. WORTHINGTON. THOS. B. LEWIS.

WORTHINGTON & LEWIS,

Publishers of the "American Farmer,"

CARROLL HALL, S. E. Corner Baltimore and Calvert streets, Baltimore.

☞ MR. WM. C. LIPSCOMB, JR., is our Traveling Agent for Maryland and Virginia.

Richmond, Virginia.—Subscribers in the Confederate States.

The large proportion of our subscribers now in the Confederate States, makes it necessary to our interest to open an office in Richmond Va., in view of the stopping of the present mail arrangements between Baltimore and those States, which will take place on the first of June. The present number closes this volume of the Farmer. Our friends in the Confederate States will therefore please make their remittances to *Mr. Thomas B. Lewis*, American Farmer office, Richmond, Va. Others will please direct as usual to Baltimore.

We beg that those indebted to us will remit by mail without delay.

Commercial Fertilizers. Large Crops.

In every view of the matter it is of the utmost consequence, as well to the community as to the agriculturist whose daily bread depends upon his toil, that this year our crops should reach the highest limit of which the soil is capable. While the production will be curtailed by drawing off of the labour of so many active young men from the plough for the purpose of wielding the sword, the consumption will be largely increased. It is too late now to increase the area of cultivation, if that were desirable with the diminution of labour. It is not too late, however, to double the crop of corn on many a poor field by the timely application of some of the valuable fertilizers in the market. We beg to call the attention of our readers who may be able to purchase, to the several articles offered in our advertising pages. They cannot, we think, go amiss in using any of them freely. To those in the Confederate States who are shut off from the Baltimore market, we do not hesitate to recommend the excellent fertilizer to be had of Fowle & Co., Alexandria. Let all supply themselves as early as possible, and let it be mixed well with the soil in the course of cultivation.

☞ Under the influence of the tempest of excitement which, about the time we were going to press last month, swept the State from centre to circumference, we were tempted to forego the purpose we had formed of making no further comment on the unhappy differences which distract the people of the States. Friends for whom we entertained sincere respect, urged that a topic not congenial with the ordinary character of our publication, should not be allowed to intrude into its quiet pages. We acknowledge the force of this objection under all ordinary circumstances, and with reference to all questions of *party* politics; and we are quite aware we would have been much more safe from offence in expressing no opinion and allowing no one to know on which side of this great controversy we were to be found. But the times and the occasion are so portentous, that it seemed to us a man could hardly be a man and hold his peace, as opportunity served him to speak out freely and fully, all he thought and felt. Having done so once, we had intended to refrain from any further comment on the subject until moved to it by the occurrences of last month. We introduce the matter now only for the purpose of saying that in future it will be excluded from our pages.

The Growing Crops.

Up to the 20th of May, we hear the most favourable accounts of the wheat crop throughout the Middle and Southern States. In some of the latter a good crop has already been harvested in excellent condition. Rye, oats and grass crops are also unusually promising. If we are to have the scourge of a long war upon us, a good Providence will shield us, we trust, from the evils of scarcity and famine.

☞ We acknowledge the receipt of the Second Annual Report of the Proceedings of the Fruit Growers' Association of Eastern Pennsylvania. From a glance at its contents, we judge that it contains much matter of interest to fruit growers.

Are Droughts Beneficial? If so, How?

Our readers are aware that we are disposed to view such questions as the above from a practical rather than a scientific point of view. We are jealous of new theories which claim to be the revelations of scientific investigation, and are unwilling to have them pass too readily unchallenged. Some two years past perhaps, Dr. Higgins, late State Chemist of Maryland, published the result of investigations in the Laboratory going to show, as it was claimed, the beneficial effects of drought. Certain mineral salts were put in solution into the bottom of glass cylinders, which were then filled with dry soil. After long exposure to the drying effects of the sun this soil was found, on the application of chemical tests, to contain a large per centage of the salts which had been drawn up with the water in which they were dissolved. Hence it was inferred that the same effect is produced in protracted droughts; the water drawn up from the subsoil bringing with it and depositing in the upper soil the soluble salts heretofore out of the reach of the roots of plants. This we think is substantially if not literally the theory of Dr. Higgins. In the past year we have seen it published in one of the English magazines, and many of the agricultural publications of this country, as an ascertained result of chemical investigation. The *Gardener's Monthly* for May contains an excellent article on the subject, the principal part of which we copy, in which is quoted an extract from the address of an agricultural chemist to his class, in which also this theory is accepted as one of the revelations of agricultural chemistry. He says: "Agricultural chemistry has further revealed to you that the drought, when the earth is parched and vegetation dwarfed and withered by the heat, is only an affliction for the present, a blessing in disguise for the future,—that 'the early and the latter rain' may produce at once abundant crops, but dry weather is needed to bring to the surface from the depths of the earth, food for the future harvest; that as the drought continues, the water from the subsoil keeps bringing to the surface the salts of lime or of magnesia, or of potash that it holds in solution."

That all the ways of God are wise and good there can be no doubt, and it is a pious duty to study out His gracious designs in dealing with us, but we are not prepared to accept *as a fact*, that "drought is one of nature's ordinances for keeping up the fertility of the soil." Nor even to acknowledge the "benefits known to follow the operation of drought," as claimed by the editor of the *Gardener's Monthly*, beyond the ordinary effects of rest, on the absence or failure of crops. On this point we are free to admit, however, that our observation may be at fault. The explanation of these "known benefits," as given below in the article from the "Monthly," are interesting and plausible, and the exception is well taken to the theory of Dr. Higgins as it bears upon the practice of underdraining. It is very remarkable, and forcibly illustrates the facility with which scientific theories are adopted by the agricultural press, that it never occurred to any one, that however true it might be in fact that these soluble salts were brought up from the subsoil, as set forth by Dr. Higgins, that the first soaking rain was a more potent agent to carry them back again.

We copy from the *Gardener's Monthly* as follows:

"It is claimed for underdraining that it makes the ground cool and moist in summer, and this is insisted on as one of its greatest benefits,—and that it does render the ground cool and moist under the most trying heats, we all know. But according to the quoted doctrine, this is an evil, rather than a blessing, and we must believe that if we would add to the fertility of our soil, we should favor the earth's becoming as dry and as parched as possible. And then, again, if drought could 'bring soluble salts to the surface,' underdraining would have the same power to carry them away,—and the result would be that the more perfectly a soil were underdrained, and the passage of water facilitated through it, the more easily would the soil be depleted of its valuable salts, which, 'held in solution' by each shower of rain, would pass away through the drains to waste.

But those who have underdrained tell us they have experienced no such losses. Though the operation has rendered their grounds moist and cool in summer, it is highly productive; and instead of the salts disappearing 'in solution' after each rain-storm through the drains, the elements of fertility in the soil is rather increased, and we have no choice left but to decide between infidelity to this so-called 'revelation,' or a belief in the rationalism of facts and figures.

We choose the latter, and with all due respect for high chemical authority, would make bold to enquire whether drought really brings 'salts to the surface?' Whether even the mere presence of salts themselves in the soil is any test of its fertility? and whether the benefits known to follow the operation of drought, is not owing to very different laws than our 'authority' supposed?

The laws of vegetable life play an important part in all questions connected with the fertility of the soil. As with science and practice, so with life and death; they mutually aid each other. Indeed, without death there can be no life.

All vegetation is founded on decay. The living plant is but old matter in process of reconstruction,—matter set free by decay, and which decomposition has resolved into its original elements. Out of the desolate ruins of the past, is the beautiful temple of life built up. 'That which thou sowest is not quickened unless it die'—even the seed must be sacrificed to afford life to its germ.

And all this is as true of the inorganic as of the organic world. Decomposition must act on the mineral, as well as the animal or vegetable matters in the soil, before they become available for the nutrition of a living plant, and the great agent in this work of destruction is the oxygen of the atmosphere.

The elements of fertility may abound in the soil, but unless oxygen has free scope to enter in and amongst them on its disintegrating and destroying duties, the soil will not be fertile, nor will the husbandman reap his due reward.

And thus it is that drought is followed by beneficial results—not for the reason 'revealed to us by agricultural chemistry' according to our author, but solely because it affords oxygen its only chance of penetrating deeply in undermined soil. Where water escapes, air will enter, and of course the deepest drought dries the soil, the deeper in the same proportion does oxygen descend to its destructive offices.

This is beautifully illustrated after every heavy summer thunder-shower. If we go out immediately after the rain is over, and before the little pools have had time to soak away, we shall find air-bubbles rising through them in every direction, by the weight of water pressing into the air spaces, and driving out the gaseous contents of the soil. If the surface of the ground has been rendered hard by traffic, the air will often be forced from many small ducts into one main channel, made, perhaps, by a worm or insect, out of which it can be seen to jet like a mimic volcano. When a boy, the writer has often amused himself by placing light feathers over these columns of air, which in some cases would rise to an inch or more in height. This is nature's method of ventilating the soil,—the way she effects a continuous circulation. As the water enters, the air, deprived of its oxygen in the service of plant life, is driven out; and then, as the water slowly evaporates, the pure air of the atmosphere follows, becomes in time exhausted, and is again driven out by the next summer shower, and so continues a beautiful and perpetual revolution and restoration.

If our view of the beneficial effects of drought is the true one, it affords 'aid and comfort' to the advocates of underdraining rather than to its opponents. The thorough æration of the soil enters largely into a correct definition of the term underdraining,—and is claimed to be, as it undoubtedly is, the most useful part of the operation. Nature ærates by the slow process of evaporation, and the crops are often sacrificed in the drought to nature's wants,—but man, by underdraining, ærates by method and system, continually and without risk; fears not the drought, and yet reaps all its advantages."

How to Cure Mutton Hams.

In answer to an inquiry on this subject, three correspondents of *The Field*, London, write as follows:

"If C. B. will procure a plump leg of mutton, wipe it dry, and then put it into the following pickle, he will have in two or three months' time a delicious mutton ham, which he may either bake or boil; a slice cut out and broiled is very excellent. It may be smoked, but here we like it better without that process: Three gallons soft water, 1 lb. coarse sugar, 2 oz. saltpetre, 3 lbs. common salt. Boil the above together, remove the scum as it rises, and immerse the meat when cold."

"Cut a hind quarter of mutton into the shape of a ham, let it hang two or three days. Mix half a pound of bay salt, 2 oz. saltpetre, half a pound common salt, half a pound coarse brown sugar, all well pounded together; make them quite hot over the fire, then rub the compound well into the meat; turn it every day; after four days add 2 oz. more of common salt. Let it lay in the brine twelve days, turning and basting it every day; then take it out, dry it, and hang it in wood smoke for one week."

"One-quarter of a pound of saltpetre to half a pound of raw brown sugar; make them very hot and rub into legs of mutton over night.—Next morning salt them with common salt. Let the mutton lay about a week, move it over, and rub in fresh salt, and let it remain another week in pickle. Then hang it up to dry. When dry keep it in canvas bags to prevent being fly-eaten. N. B.—Do not let the mutton lay in the wet brine, but place something under to raise them from the wet or dropping that will fall from them."

HOUSEKEEPERS' COLUMN.

N. B. Worthington, Esq.,

Dear Sir: At your courteous invitation, I come again with my humble offering for your "Kitchen Cabinet." In my last communication you have my platform, which I do not in any instance intend to abandon. Believing as I do, that in these times of *uncivil* war and impending ruin, when scarcity has enthroned herself among us, and gaunt famine threatens from the near foreground, it is the imperative duty of all, both rich and poor, to practice economy in all things—for who shall say now, I am rich beyond the possibility of want? To-morrow his riches may vanish like a dream, and he be left more helpless than those nurtured in poverty, because he has learned no lessons of frugality—I shall give you the formula of two or three simple, savory, and withal wholesome dishes of my own creation, the perfection of which demands no extravagant outlay of money or material:

Cucumber Toast.—Select your cucumbers—fresh, crisp, medium size—just such as you would prefer if served up in the usual manner. Pare and slice up lengthwise in cuts a quarter of an inch thick. Rinse in cold water, dip each slice singly in flour, and hurry them into the dripping-pan, using for material to fry them in, the gravy in which either beefsteak, veal cutlets or mutton chops were cooked; or butter may be used; but be sure to fry briskly until the slices are a light brown on both sides. Have your bread toasted, buttered, or dipped, as you prefer, and close at hand. Slip the slices of cucumber hot from the pan between slices of toast, and serve at once.

Any one following these directions implicitly will find *cucumber toast* really good to eat.

Rice Padda.—Boil the rice first for half an hour in water, taking care that it does not scorch. Then cook slowly for another hour in *skimmed* milk until the grains are reduced to an impalpable paste. Fry veal, cut in thin, delicate slices, until thoroughly cooked. Dip the slices into the rice batter. Return to the dripping-pan and fry to a bright brown. Serve while hot.

We think these rice paddas something superior to the celebrated Norfolk oyster fritters, and have no objection to others endorsing our opinion upon fair trial.

Onion Ormaloo.—Onions are a cheap, wholesome vegetable. So are potatoes; only rather plebeian, and sometimes despised by rich people. Onions, too, are not always a favorite with everybody, though I think they would be with most people if made into ormaloo, as they are in that style palatable, delicate, and leave no disagreeable odor on the breath after eating.

Boil a dozen honest-sized onions until most thoroughly cooked through. Boil at the same time the same number of potatoes until perfectly done. Put both onions and potatoes, smoking hot, into a deep dish or bowl, pour in a pint of sweet milk, a trifle more if necessary; break in three eggs, season with salt and pepper, and mash up as expeditiously as possible with a pestle until there is not a vestige of a lump left, and a complete amalgamation is achieved. The mass may be artistically put up in *blanc mange* or jelly moulds, or served in vegetable dishes, and is perhaps the most palatable dish that can be made out of any two vegetables in use.

Soft Tommy—*Made in a minute.*—One pint of sour milk, one teaspoonful saleratus, heaping tablespoonful salt, tablespoonful lard. Stir in flour until the mass is as stiff as you can stir it with a strong iron spoon. Into the pan and oven with it, and bake till done as you would any other bread. "Soft Tommy" is *good* for tea twice a week when one is in a hurry.

Exhortation.—Never throw away a spoonful of sour milk! In a family where a variety of cake is made, it is a necessity. It is good for a hundred things other than *smear kase.* If I were obliged to choose between sour milk and eggs in my cooking, I should say, *good-by eggs.*

Some M. D. somewhere, at some time, has pronounced saleratus poisonous, and everybody fears a violent death by saleratus. Once M. D.'s everywhere declared a hard-boiled egg absolute death to an invalid. After a great many years, they discovered that an egg boiled hard is a great deal easier of digestion than a half raw one. M. D.'s are not always infallible.

I use a great deal of saleratus in cooking.—We eat it all the time—every day; have done so all our lives; never been poisoned yet; don't think we shall ever be by saleratus. We enjoy very fair health, and our children are as hardy and robust as any in the State. I think if we are spared until we fall by saleratus, we shall live to see the unhappy difficulty now distracting our people and country, amicably and finally adjusted.

MRS. E. D. KENDALL.

Reisterstown, Md.

Soda Biscuit.—To a pint of clabber one teaspoonful of sup. carbonate of soda, dissolve the soda in the clabber; one teacup of butter; salt; flour enough to make a stiff dough; work them well together, roll it to about quarter of an inch in thickness; cut them out with a ring; bake quick.

The War with the Curculio.

I have had a long war with the curculio. I have battled with him through fifteen campaigns, and, except the first three, when I relied upon the weapons of quackery, have always conquered. I have used the various washes and fumigations of horrible odors. I have built fortifications of cotton and tar, and troughs filled with oil, round the bodies of the trees. I have placed whole loads of offensive manures under favorite fruits, and on one occasion bored holes in the bodies of the trees and plugged in charges of sulphur.—But since those three years I have resorted to the *jarring* process systematically, and have found it a perfect remedy. My fruit crops since have never failed; even the apricot and nectarine trees never losing any portions of their crops from this cause, and frequently overloaded.

The *black knot*, that disfigures the plum orchards in so many parts of the country, and finally destroying so many trees, is also caused by the curculio.

The *rot*, that carries off in a few days so many kinds of plums just before they ripen, and when we think the crop secure, is also caused by the same enemy.

In France, parts of Italy, in Persia, and Independent Tartary, they have apricots as we have peaches in our Middle States. In the more mountainous parts of these countries, where they have the extremes of heat and cold, they flourish best; in this country the cultivation of this delicious fruit has not been understood. We have supposed it could only be grown under glass, or as a wall-fruit; it will flourish high up in mountain regions, and the less early spring weather the better.

In parts of Germany, plum trees line every road, and the fruit is so abundant that they can send dried plums or prunes to us so cheap, that the beautiful boxes they are packed in are worth nearly the cost. In those countries *they have no curculio*. We have the same kinds of fruit trees, as favorable climate, and soil as good, but a large portion of our population, in a majority of seasons, have but little fruit of any kind, and but few ever see an apricot. Now the question arises, What can be done? We may hope for the discovery of some cheap and effectual remedy. We may hope also for some cure for consumption or cancer, and we have no right to suppose that we shall always hope in vain; but we are obliged to say that such cures are not now known. I do not wish to discourage others from experimenting with the various remedies so boldly recommended, but merely to say, that my experience has been so unfavorable, that I have no confidence in any of them. Suppose you discover a fumigation so disagreeable that it would drive the curculio from your trees; it would not kill them, and back they would come as soon as the smoke had cleared away. And the idea of keeping up that kind of a war for six weeks is absurd. About the same may be said of the various washes that are to be thrown into the trees by hand-engines or syringes. Tar upon the bodies of your trees would prevent them creeping up for a day or two until it became glazed, but they are already in the trees, and seldom creep either down or up. And they can fly and pass from one orchard to another. No. The curculio attacks our fruits with but one object—to perpetuate its race. The young fruit is its proper nidus, and if you drive it from one tree it will find another. Each female curculio has several hundred eggs to dispose of, and if she can, will take as many hundred young plums for their portions; and I think I see her laughing in her sleeve at the idea of disagreeable odors stopping her in the performance of that duty.—DR. TRIMBLE, *in Horticulturist*.

Farmers' Tools.

A certain number of tools, and some skill in their use, will often save the farmer much time in sending for a mechanic, and some expense in paying him. Every farmer should be able to make repairs on his wagons, gates, buildings, &c. A room, or portion of a room, should be devoted to keeping these tools; a pin or nail should be inserted for each one to hang on, and the name of each tool written or painted under the pin, that it may be promptly returned to its place, and any missing one detected. Keep every tool in its place—do not wait for a more convenient season, but return every one to its pin the moment it is done with. If left out of place a minute, it will be likely to remain a week, and cause a loss of time in looking for it a hundred times greater than in replacing it promptly.—Keeping everything in its place is a *habit*, costing nothing when formed. The tools should be, a hammer, saw, augurs, brace and bits, gimlets, screw driver, wrench, two planes, chisels, mallet, files and rasp, saw-set, trowel, and a box with compartments for different sized nails, screws, nuts, bolts, &c. Common farm implements and tools, such as hoes, spades, shovels, forks, rakes, scythes, &c., may be in the same room, on the opposite side, and the same precautions taken to keep every one in its place.—*Ex.*

Oxen that have been Worked make the Best Beef.

Editors' American Stock Journal:

So says your correspondent "Tamworth," and he writes very scientifically about "oxygen and nitrogen," to prove what he says is true; but, sir, we believe no such thing. As well might he say that a race-horse in high training would make the best beef. We cannot allow this observation to pass current—we cannot swallow it, no how you can cook it. A work ox the best beef! Why, sir, this is worse than Mr. Sotham's assertions about Short Horn beef, which we will not here repeat.

Now let us see how this inhaled "oxygen" and expelled "nitrogen" or "hydrogen" makes the best beef; does working an ox make his muscles soft and tender? No, sir; working an ox hardens his muscle; it hardens the muscle of a race-horse, or the muscle of a trained man to run or fight. Working oxen not only hardens the muscle, but it grows and produces a larger amount of cartilage and tendon, or gristle, than if they were not worked. Does Thomas Slater, of Kensington, buy oxen that have been worked for Queen Victoria's table? No, sir, certainly not! Does any butcher who has a good family trade, buy oxen that have been worked for his customers? No, sir, he dare not do such a thing! The very best beef is produced from a three years' old Highland Scotch ox that has not been worked, and next to that, a three years' old Short Horn heifer; the weight of the former should not be more than seven hundred pounds, and the latter about five hundred and sixty pounds. Prize-fed beef is *not* the best beef, nor is prize-fed mutton the best mutton. I will not say it is the worst—but I will say that prize meat such as "Tamworth" describes, is the most extravagant and unprofitable that can be bought, "Tamworth's" statement to the contrary notwithstanding.

Some twelve or fourteen years ago there was a stand made in our cattle-shows to put down the nonsense of over-feeding. And in our capacity of public judge of Short Horns at one of the agricultural shows in the north of England, my colleagues and self were called upon to judge four two year old heifers; one of them had been bred for, and shown as a prize animal several times, and had never been beaten; she was white—bred by Mr. Booth of Warluby—the very best of blood, her shape, form and touch were perfection, and take her as a whole she was considered by the crowd as a winner, certain. The other three were poor, at least they were in good breeding condition, and that was all; but they had blood, size, form, touch and color, but they were not fat; they were placed 1st, 2d and 3d, and the fat one nowhere, to the astonishment of the uninitiated. The answer and the reason for so doing was, that she never would breed (she never did) and that she was nothing but blubber. We were highly praised for our decision, which for a short time put a stop to the foolish practice of irreparably injuring fine cattle by over-feeding and pampering for the sake of show.

With all due respect to your correspondent's opinion as to working oxen making the best of beef, I remain, yours faithfully, OLD WHIP.

A Wise Saying.

An English farmer recently remarked that "he fed his land before it was hungry, rested it before it was weary, and weeded it before it was foul." We have seldom, if ever, seen so much agricultural wisdom condensed into a single sentence. It would be difficult to avow an agricultural practice, each particular of which would be more opposite to the practice of the land-killers and skinners of the South. Such persons do not feed their land at all. Though land may have nine lives, like a cat, yet it may die at last of starvation. "Weary land." How apt an expression. Not utterly exhausted, but tired, wearied. Reader, have you not some land which, this summer, will pant and blow and struggle under the burden of a starveling and sickly stalk of corn. "Weeded it before it was foul." Why some of our planters raise weeds for manure. Vile pests, of no use to man or beast, are suffered to grow up and encumber the ground, merely for the sake of the privilege of burying their dead bodies to supply vegetable matter to the soil. On a perfectly conducted plantation, no plant would be suffered to mature its seed which was not of some known and positive utility.—Peas and clover are better than weeds—they feed both the soil and domestic animals, and give no trouble to succeeding crops. Remember the practice of the English farmer. Do not wait until your land begins to get poor before you manure it. If it is rich, make it richer. Do not wait until your land begins to fail before you rest it—give it rest in time to prevent its ever being tired. Do not wait until your plantation is stocked with weeds before you begin to destroy them. One weed destroyed this year will save much hoeing next year. Manure soon and well, give abundant rest and cultivate clean. He is a good farmer who observes these rules.—*Southern Cultivator.*

Practical Theory of Fertility.

BY BENJAMIN AYCRIGG, PASSAIC, PASSAIC COUNTY, NEW JERSEY.

The chemical condition of a soil necessary to fertility (when reduced to its lowest terms, after separating the adventitious by means of a comparison of the reports of a great many analyses of soils, and of plants, and experiments with various fertilizers) appears to be this: The soil must contain silica, alumina, peroxide of iron, lime, magnesia, potash or soda, humic acid, and at least one of the three mineral acids, viz: phosphoric, or sulphuric, or muriatic. Also, there must be no salts of the heavy metals; also, the alkalies must be balanced with the acids, so that neither shall be in excess, thus making the soil exactly neutral.

The reduction by chemical equivalents of a great number of analyses of soils reported, both good and bad, has proved to me that *neutrality* is the most distinguishing characteristic of a fertile soil for ordinary field crops. This neutrality can be produced and made permanent without a previous analysis, without danger, at the smallest expense, and with exact precision, by pure lime, (or such as contains no magnesia,) in excess of all the acids in the soil. At the same time, this excess decomposes all the poisonous salts of the heavy metals, and makes them valuable fertilizers. It also liberates potash, and soda, and phosphoric acid from their compounds. The remaining excess of lime becomes a carbonate, as chalk, laid by in store; neutral and inert while not required, but still ready to neutralize any future increase of acid. Pure lime is the only substance that can be used artificially to produce these results. In natural soils this neutrality is produced by any of the four inorganic alkalies.

The above chemical conditions necessary to fertility can be produced by the five following simple, cheap, common applications, provided the ground be a fair *loam*, (or mixture of *sand* and *clay*,) and contain the ordinary amount of iron in any soluble form, although at present it may render the land barren by its poisonous condition as sulphate or phosphate. The proper quantities of the various applications must evidently vary according to the present condition of the soil. These can be ascertained by each culturist for his different grounds, by varying the amounts and noting the results. As a preliminary experiment, I suggest such quantities as I suppose will answer where the same substances are deficient in the soil, and at the same time not produce injurious excess where they are abundant at present.

1st. *Pure Lime in Excess.*—One large application, to make an artificial limestone soil as a basis of operations, say 200 bushels per acre for ordinary land, and thence increasing, with the vegetable matter in the soil, up to 1,000 bushels or more for a drained swamp. The only danger in this application in excess is from magnesian stone lime. Shell lime is pure. A bushel measure means slaked, struck.

2d. *Magnesian Stone Lime.*—A moderate quantity as food, every three or four years, say 50 bushels, and not to exceed 150 bushels, even for rich land.

3d. *Gypsum* (plaster.)—To supply sulphuric acid, say three bushels every three or four years; otherwise, twice as much "salt-cake."

4th. *Common Salt.*—To supply chlorine (muriatic acid) and soda, say six bushels every three or four years.

5th. *Decomposed Vegetable Matter.*—If in the form of barn-yard or other fermenting manure, it should not be applied within some months, either before or after fresh lime. An excess of fresh lime will expel all the ammonia from fresh manure, or any other ammoniacal compound, as guano, etc.; but if the vegetable matter be in the form of muck, or mud, or sods, or pumice from cider-mills, or rotten wood, bark, tan, or sawdust, then it should first be composted with lime to neutralize the acid before it is applied, unless it be for acid plants, as strawberries, cranberries, etc., where lime is said to be injurious, although necessary for field-crops and for fruit-trees.

Three of the inorganic constituents of plants are not supplied in the above, on account of the expense, viz: manganese, potash and phosphoric acid. They may all be abundant, even in a barren soil. They may all be liberated and brought into use by the excess of lime; or they may all be absent. In this condition we have evidence that we can have fertility without them. Thus manganese does not appear to be necessary when there is an abundance of iron. Potash is at times replaced by the other alkalies, lime, magnesia, and especially soda, which is almost identical with potash in its chemical action. Soda we apply in common salt, and also in salt-cake. Phosphoric acid is at times replaced by the other acids, (in a great measure at least.) We have humic acid in the vegetable matter, sulphuric acid in gypsum or in salt-cake, and muriatic acid (chlorine) in common salt.

It is, doubtless, better for plants to have a supply of every thing; and after the cheaper substances have been fully tried, then apply the

more expensive fertilizers, and ascertain whether the increased fertility will pay for the increased expense. But in many cases they will now be found useless. Thus, the benefit from wood-ashes, soda-ash, potash, fresh manure, Peruvian guano, is frequently due solely to their alkaline action in neutralizing an acid soil well supplied with inorganics. This neutrality has already been produced by lime. So, again, where the soil contains sufficient phosphoric acid, the superphosphate of lime will have no effect, since gypsum gives us lime and sulphuric acid, the other two ingredients in superphosphate of lime.

For a partial improvement, magnesian stone lime is better than shell lime. It is cheaper per bushel, still cheaper per pound, and much cheaper in proportion to effect, since magnesia is more powerful than lime as 4.83 to 3.50. At the same time, it also furnishes magnesia as a food preferred by some plants. Thus the grain of Indian corn contains ten of magnesia to one of lime; but it can not be used freely, since an excess of burned magnesia will render the land permanently barren from excess of permanent alkali, unless counteracted by some acid, as fresh muck or old manure. Pure lime, on the contrary, soon becomes "mild or carbonated, as chalk, when freely exposed to the air, and hence may be used" in almost unlimited quantity, without any permanent injury. It is only a waste of money and a waste of time until the large excess becomes mild.

The proposed excess of caustic lime will be advantageous in an open field, to kill off all plants, including weeds, and thus prepare it for the new crop as soon as the lime shall have become mild; but it would also kill trees, and render a garden useless for a time. Therefore, in these cases, we can not use the excess necessary to decompose minerals, and must confine the liming to the sole purposes of producing neutrality and of supplying food. This may be done by frequent small applications of fresh lime, or by one large application of carbonate of lime in the form of shell marl, or ground shells, or chalk, or old mortar, or old walls, or scrapings of limestone roads, or rotten limestone, or pure lime exposed fully to the air until, when stirred in water and allowed to settle, the water does not taste of lime.

The organic constituents of plants, or those elements originally derived from the air, are carbon, nitrogen, hydrogen, and oxygen. In fresh manure, ammonia is in excess, from the decomposition of the nitrates contained in the food. But after these have been exhausted the manure rots down the same as muck, etc., successively into ulmic, humic, geic, crenic, and apocrenic acids, (garden mould,) composed exclusively of carbon, hydrogen, and oxygen in different proportions. At each step, the air is decomposed; the nitrogen joins with the hydrogen of the earth acid, forming ammonia, while the oxygen joins with the remainder of the earth acid and forms carbonic acid gas, when the earth acid drops to the next grade. Hence a good supply of the roughest vegetable remains will for a long time furnish ammonia, the most valuable and evanescent ingredient in Peruvian guano. This ammonia from muck, on the contrary, forms most when most required, increasing with the heat of summer, becoming quiet in winter, to be aroused the next season for the next crop. I have no positive authority that the air is exactly thus acted on, but I give it as an hypothesis that will explain the power of humus to "*absorb*" ammonia from the air, and at the same time account for the various chemical transformations among these earth acids that do not appear to be agreed on among chemists. Thus Liebig says: "The humic acid of the chemists is the product of decomposition of humus by alkalies. It does not exist in the humus of vegetable physiologists." Now, I found that a specimen of soil taken from a hedgerow, and composed mostly of rotted sods, and very prolific in sorrel, would neutralize 19,000 lbs. of slaked stone lime, if this soil covered an acre of ground eleven inches deep, while the same amount of soil, imperfectly burned, required but 3,000 lbs. Thus there is in this soil a vegetable *something*, capable of neutralizing 16,000 lbs. of lime per acre.

I propose to the horticulturist to try the experiment whether muck neutralized by lime will not answer in place of guano. If so, he will not care whether wood rots down into humus or humic acid; nor yet whether ammonia is thereby collected *from* the air, or formed by decomposition *of* the air. Again, we might infer from Liebig that decomposed vegetable matter is not necessary. His argument may be sound, but I prefer to imitate the fact, that decomposed vegetable matter is invariably reported in all fertile soils, although it may be the consequence, and not the cause, of fertility.

Again, some of the most intelligent and scientific culturists object entirely to the use of magnesian-stone lime. If they are right, the second application should be replaced by pure lime, since an occasional liming is found beneficial, even on rich limestone soils. I have seen land rendered permanently barren by magnesian lime,

but only by excess. I have also seen whole districts raised to fertility by its use, and have used it largely myself in Pennsylvania, where they do not exceed 25 bushels per acre for poor land, and 50 bushels for rich land. They calculate fresh heaped measure. This would make about 75 and 150 bushels slaked, struck.

The chemical proof of the above would occupy more space than you can devote to any one subject. The best proof is a practical test by a few judicious culturists. This they can do on a small plot, and ascertain whether it deserves the name of theory, at a very small part of the labor that it has cost me to collect and analyze the facts upon which it is founded. If true, it is important; if not true, let us have the objections, that something better may grow out of it.

[We give the above interesting speculations from the *Horticulturist*, contributed by a gentleman "well known in the scientific world; an original thinker, and a pains-taking experimentalist." We commend them to the attention of intelligent readers, not as worthy of adoption as the "practical theory of fertility," but for examination and experiment.—ED. FARMER.]

Northern and Southern Clover.

Messrs. Editors: I notice your quotation from the Boston *Cultivator*, on clover, which says: "The Northern is much the largest growth, the stalks being sometimes three or four feet long and as coarse as pea vines—the Southern grows scarcely half the height, and matures much earlier, makes more blossoms than the Northern, and the second growth of the same season is usually more abundant than the Northern, often nearly equalling the first, and being *generally preferred for seed.*" Now I never saw a second growth of the large clover. The large clover if cut for hay once, cannot be cut again that season—the seed has to be taken from the first and only crop of the season; and the small or Southern clover won't produce seed the first crop in the season, unless pastured off until about 15th June, and then it will generally give a better crop of seed than when cut about the last of June. I have wondered why the seed of what the Boston *Cultivator* calls Northern, should bring most money in market, as I never could see the use of raising it, unless it was for the seed. As hay I think it worthless, but it must answer somewhere, else the seed would not sell highest. —JOHN JOHNSTON, *in Country Gent.*

Camomile, the more you tread it, the more you spread it.

Disappearance of the Wheat Midge.

In the present communication I propose to consider the recent disappearance of the wheat midge over considerable parts of the country, and to relate the circumstances under which this event has occurred within the sphere of my own observation.

In the summer of 1859 it was reported that in Seneca county and other districts in the central part of our State, the wheat midge had vanished to such an extent that the wheat crop was sustaining no injury from it. I was inclined to be skeptical as to the correctness of this report, for here in the eastern section of this State I met with the larvæ of this insect in the heads of the growing wheat quite as numerous as they had customarily been in previous years, and the crop from several of the fields in my neighborhood on being thrashed was found to be materially diminished from this cause.

That this insect was still with us in full force was further evident from the flies coming in numbers about the lamps in our dwellings in the middle of June last, as narrated in my preceding communication. On thus seeing the parent insects so plenty at that time, I doubted not but that I should a month later meet with their progeny, the yellow worms in the wheat heads, the same as in former years. But on going to the wheat fields in July, to my great surprise, none of these larvæ could I find in any field within a circuit of several miles around me. As this was such an unexpected and important fact, I was anxious to know if the same exemption prevailed through the country generally. As this insect originally came to us from the North, in the State of Vermont, just before the wheat harvest I made an excursion in that direction to a distance of fifty miles, inspecting every field of this grain which I came to along the road. And though, in consequence of the uncertainty of this crop since this insect has been in our country, the wheat fields which I passed were noticed to be small and far between, they were in every instance observed to be remarkably fine, the heads of the grain large and smooth, and in no instance ragged and torn by the yellow birds to feed on any larvæ nestling therein. And on opening the heads of every variety of appearance selected along the edges of several of these fields—for it is on the edges that these insects are most apt to occur—not a solitary larva was anywhere met with. Thus over an extent of country some sixty miles in length in Washington county, in this State, and Bennington and Rutland counties, in Vermont, I am assured, by careful personal ob-

servation, none of the larvæ of the midge were to be found the past season.

In the central part of the State, though the wheat crop the past season is reported to have been less productive than it was the year before, it is said to have received no injury from this insect.

It was circulated in the newspapers the last summer that in Canada West the wheat crop was remarkably promising, and was escaping from molestation by the midge, which insect had been subdued by a parasitic insect foe to it it that had appeared in that province.

On the other hand, in Western New York, particularly in the Genesee district, this insect continues to be as common as heretofore. Different persons residing in the vicinity of Rochester, whom I met at the recent annual meeting of our State Agricultural Society, informed me that they examined the heads of their wheat both last summer and the summer before, and found the yellow larvæ therein quite as numerous apparently as they had been in previous years. Yet they say the insect seems to have become inert, as though it was passing into desuetude, for it certainly has not injured the wheat crop the two past years as it has done before. We, however, cannot think these insects have really lost any of their energy. To rear a given number of them to maturity will probably require the same amount of nourishment one year that it does another. It is therefore more probable that some peculiarity of the seasons has so favored a vigorous growth of this grain that it has been better able to withstand and recover from the drawback it has received from this enemy.

It appears then, from what information we possess on this subject, that although the wheat midge still abounds in some sections, over a large extent of country it has become remarkably diminished within the past two years, and in some places has entirely disappeared.

Though I was unable to discover any of the larvæ of this insect the past summer, I cannot suppose it to be totally extinct in the district which I traversed. Scattered here and there in the wheat ears, so sparsely as to elude detection, it is probable that a few of these larvæ were present. But their numbers must be so extremely limited that it will be impossible for them to multiply sufficiently to do any appreciable injury to the wheat crop this present year. We hence obtain this important practical deduction from the facts stated—wheat may be sown this present spring, in this part of the country at least, with the fullest confidence that it will receive no detriment from this insect. I tell my neighbors they may safely devote as much land to this grain now as they were accustomed to do thirty years ago, before the midge invaded us, for, though other casualties may perchance occur to prevent so abundant a yield as we had the past summer, this most dreaded enemy will not trouble them to any sensible degree the present year.

What its future history is to be, time only can show. Genial seasons, or other circumstances favorable to it, may cause it again to multiply, and in the course of two or three years become as great a pest as it has hitherto been. But in view of the facts as they stand at present, I am inclined to think that in this country we have now had the worst of this insect, and that it will never again be so calamitous to us as it has been. I have heretofore, on different occasions, expressed the opinion that the career of this insect would be analogous to that of its predecessor, the Hessian fly, which, on its first introduction to our shores, gradually overspread the country, everywhere devastating the wheat fields for a number of years, after which it subsided, and has seldom since attracted any particular notice. And it appears to be one of nature's laws that when an insect is newly introduced into a country whose climate and productions are adapted for sustaining it, it immediately multiplies to a surprising extent, and thus usurps a place which does not belong to it in the arrangements of nature, and which it consequently cannot permanently continue to occupy.—Asa Fitch, *in Country Gentleman.*

Manuring Evergreens.

The best manure for *all kinds* of evergreens is peat or vegetable mold mixed with ashes and allowed to stand in a heap for six months, or longer, before using; vegetable mold alone is excellent. Animal manures are injurious, unless they are so thoroughly rotted that the mass looks like black mold. If a tree appears sickly, remove the surface soil and apply fresh loam, mixed with the above manure, to the roots, forking it well in. A little circle dug around the tree is not sufficient, but the extreme rootlets must be laid bare, and the new loam applied there. Evergreens sometimes suffer from stagnant water about their roots; in that case, the soil should be drained; some, however, will grow best where there is water, our native Tamarack, for example, and even the Hemlock likes a moist soil, which should, however, be drained. European Larch, Spruces and Pines grow on dry land; yet we have seen plantations in Europe of the Larch, Silver Fir, Norway Spruce and Scotch Pine on wet peat soil with no drainage, and the trees were strong and healthy.—*Ex.*

Endless-Chain Horse-Power.

J. B., who inquires about endless-chain horse-powers and thrashing machines—page 208 of *Country Gentleman*—appears to be in as great a quandary as I was when I first commenced farming. But, I trust, his doubts and fears can be readily removed.

There always has been in this town, a very great prejudice against endless-chain horse-powers; and they have been so denounced, by men who go about the country with the large eight and ten-horse sweep powers, thrashing and sawing wood, that farmers are really afraid to have anything to do with them. But in the towns adjoining the one in which I reside, where there are better and more economical farmers in every respect, the endless-chain powers and the thrashers are so numerous, that a ten-horse sweep-power is seldom met with.

To give you an idea of the prejudice against this kind of horse-powers, I will state, that when my power, which is in good order, was set up last week at auction, no one would bid any sum on it, and so we were obliged to pass by it.

The great cry against them is, "they are a notorious horse-killer." This little short sentence embraces the whole objection and argument against them; and I do not fear to say, boldly, that *it is no such thing*. The prejudice is totally groundless, and the conclusion a very wrong one—and I can prove it to the satisfaction of any man who will not be, or has not been, swayed by prejudice.

My Experience with Endless-Chain Powers.

In the year 1846 I purchased one of Wheeler's one-horse powers. With horses which weighed about eight hundred pounds each, with a very poor thresher we could thresh with ease seventy or eighty bushels of wheat per day, and more than twice as much oats. When sawing firewood, three men would saw about one cord per hour, and with the saw that I now have, the same horse and hands would be able to do double that amount. Besides threshing and sawing firewood, I used this one-horse power for driving my turning lathe, grind-stone, fanning mill, straw cutter, and for slitting lumber of all kinds for my buildings, and sawing lath, &c.

Not being exactly satisfied with a one-horse power, in 1853 I made a two-horse power of the one-horse power by cutting the rods in two and welding in a piece of rod, so as to make them longer, and by making a new platform. Now it works most complete. I can saw three cords of wood per hour with two horses, with a circular saw, and with a drag-saw, with no help but a boy ten years old, I sawed off logs twenty-six inches in diameter in seventy-five seconds per log, including starting and stopping time; drive my grist mill, clover machine, and horse corn sheller, with which we can shell, clean and deliver in the bag, ready for market, seventy bushels of shelled corn per hour; and by driving business a little, we could do more than this.—But this is ordinary work with an ordinary elevation of the power.

Two years ago I had a good crop of barley, and could not get it half in the barn, and so we would haul a load to the barn, and put the horses on the power, and thrash it about as quickly as we could pitch it up into the mow, and with the same help that was necessary to merely unload it.

For several years past I have raised more or less buckwheat, and by having a horse power and thrasher of my own, I was enabled to get my buckwheat all thrashed before my neighbors had really thought of thrashing theirs. Last fall was a very unfavorable autumn for securing buckwheat; but as soon as the buckwheat appeared at all dry we could thrash; while my neighbors lost full one-half of their crop before they could possibly get it thrashed. But this is not all. As my buckwheat was secured before it had become water soaked, it would make much better flour, and millers were willing to pay from four to five cents more per bushel than they would pay for that which had been exposed to storms for several weeks.

My thrasher stands on the second floor of the barn, and the grain falls on the first floor. Therefore all the help that is needed is a boy to keep away the straw, which a very small boy does with ease, and one to feed, and one to pitch the grain off the wagon. As a general thing, I thrash my grain in the winter, when we have but little to do, and when we can use up the straw economically.

A few years ago, as my father-in-law was accustomed to thrash all his grain, and saw all his wood by hand, which kept them worked down all winter and spring, I induced his son, against the remonstrances of his father, to purchase a two-horse power and thrasher.

The result was, it removed, most effectually, all their prejudices and doubts and fears lest it would not pay, and they were enabled to do their thrashing and sawing wood in a very short time, without working like slaves, and he soon earned enough, working for his neighbors, to pay for the machine. There are two sweep powers for sawing wood within half a mile of him, and while they are able to get a few jobs, he has

more than he can saw. He makes from $3 to $4 per day, and does not work very hard at that. I should hardly know how to get along on a farm without a two-horse railway power.—*Co. Gent.*

A Remedy for the Potato Disease.

The following letter to the editor of a Bristol paper is worthy of notice:

"I beg to draw the attention of the public to one of the most effectual remedies for the preservation of the potato from the annual visitation of the disease. In all affected potatoes, even before the disease is visible to the naked eye, there is to be found a degree of moisture very far in excess of that to be met with in sound potatoes; and this watery principle gradually increases until the disease itself makes its appearance, when the character of the potato is changed; and the transition from comparative soundness to complete rottenness is sometimes the work of a day, but oftener the doings of an hour. Cultivators are indebted to Professor Bollman, of St. Petersburg, for the accidental discovery of a remedy, which has been found to answer so well in Russia, that on many estates drying houses have been built for the purpose of carrying out the experiment; and as it has been in operation in that country since 1853, it has, consequently, undergone seven years' trial. In the autumn of 1855, Professor Bollman received from a friend—a colonel in the Russian army, stationed in Siberia—a sample of a new potato, with which he received two recommendations—namely, good in quality, and a perfect hundredfold in produce. These potatoes were accidentally placed on the back of a stove used for heating the Professor's study, where, by some mischance, they were forgotten till the planting season arrived. When discovered, they were shrivelled so much, that fears were entertained they would not grow at all. However, the potatoes were planted, and flourished to such a degree, that the two recommendations before mentioned were pronounced to be verified; and what was more remarkable still, although all the potatoes in the neighborhood, and throughout the country, were more or less affected by disease, every potato of the new kind was entirely free from the disorder. This induced the Professor to adopt the expedient of drying; and, in consequence, the entire produce was submitted (after being dug) to a high temperature, which had the effect of charring some of the potatoes, and shrivelling the rest. It was surmised, at the time, that some of the charred potatoes were killed. They were, nevertheless, planted at the proper season; and the charred potatoes grew, and did quite as well as those potatoes which were merely shrivelled.

The year 1855 also proved that, although the disease was generally distributed throughout the country, not one of the Professor's new potatoes was affected by it in the least. The experiment was again repeated in 1856; and the crop exhibited the same freedom from disease. The kinds mostly in cultivation were then operated on—sorts which were yearly more or less affected by the disease—still with the same result. The digging-time of 1857 produced a splendid crop of potatoes. Upwards of three acres were planted with kilndried potatoes; and, although the produce exceeded 1,600 bushels, not a diseased potato was discovered. In 1858, Professor Bollman erected a drying-house, with heated floors, on his estate; and within the past two years, similar erections have taken place on the different estates of the principal landed proprietors.

It is gratifying to find that the action of the shrivelling process on potatoes already diseased arrests the progress of the infection, and kills the disease, thus leaving a portion of the potato sound enough to be eligible for spring planting. It has been stated that by the constant raising new varieties from seed, for planting, the disease may be considerably diminished; and this proved to be the case with the Fluke Kidney; for the first two years after it was introduced, and even after its cultivation had become pretty general, this famous kidney had not been attacked by disease; but last year the Fluke had been in some instances as badly diseased as the Fortyfold, Regents, &c.; so that the process of kilndrying promises far greater advantages and more certain results than all the expedients put together, which have been from time to time offered for the consideration of the public.

I am, sir, your obedient servant,

R. Miles."

—*Farmer's Magazine (London.)*

Salt to Save Manure.—Dissolve common salt in water, sprinkle the same over your manure heap, and the volatile parts of the ammonia will become fixed salts, from their having united with the muriatic acid of the common salt; and the soda thus liberated from the salt will quickly absorb carbonic acid, forming carbonate of soda; thus you will retain with your manure the ammonia that would otherwise fly away, and you have also a new and most important agent introduced, viz: the carbonate of soda, which is a powerful solvent of all vegetable fiber.—*Gardener's Chronicle.*

Hungarian Grass.

Much has been published in reference to this grass, and upon apparently good evidence it has been both commended and condemned. Farmers are generally incredulous, and inclined to look upon anything new with a suspicious eye. Hungarian grass, when first introduced, was represented as something wonderful, and I think there has been at all times a disposition to condemn it as a humbug without giving it a trial.

In 1859, I sowed about two bushels of seed on three acres of ground, soil a black loam, on a hill-side inclining to the east, and rather moist than dry, although not wet land. I sowed in May and harvested in August, cradled it, let it lay in the swath a day or two, and then bound and shocked it like oats, had one hundred dozen large bundles; it was cut when fully matured and beginning to die out and dry a little. I fed it in the winter to horse stock, colts and brood mares, and some little to my work horses; they all seemed very fond of it, and did well upon it.

In 1860, I raised about the same amount, and fed it to the same stock, with a like satisfactory result. In the early part of the past winter, my colts were fed about as much good hay, clover and timothy mixed, as they would eat, and four ears of corn per day; when we commenced on the Hungarian, we gave them two sheaves each, morning and evening, with nothing else, and they improved perceptibly in ten days, not perhaps that they gained much flesh, but their hair was more bright and lively. After feeding them in this way some weeks, we changed to oats, giving them two large sheaves each morning and night to those two years old and upward, and three sheaves to two yearlings. The straw of the oats was bright and clean, harvested without rain; we thought they did not do quite so well upon it as the Hungarian.

From the above experience I conclude there is not much difference between a dozen good sheaf oats and an equal amount of Hungarian grass as food for horses, but I would much rather have one hundred dozen each of oats and Hungarian, than two hundred dozen of the best oats. We fed a pair of working mules upon Hungarian several weeks; they did well upon four sheaves each per day, without any other food. I expect some persons have injured their stock by feeding it as they would hay and grain with it; it is too strong food to be fed in large quantities with clean oats or corn. Turkeys and chickens are fond of the seed and get very fat upon it. Some think it is a strong feeder, and rapidly exhausts soil; my little experience would not justify such conclusion. I raised a very good crop of corn after my crop of '59, and the ground is now in rye of a strong growth for the season. My crop of last year was followed by wheat, which looks equally well with another part of the same field, which was in oats. I have noticed, however, that it does not grow tall enough on a thin soil to be harvested conveniently.

If I were raising horses upon a flat, rich farm, inclined to be too wet, I should certainly raise Hungarian grass for their winter food, in preference to any other crop.—*Cor. Ohio Farmer.*

Keeping Butter.

The celebrated "Philadelphia butter" is generally made for immediate consumption; it is seldom packed for long keeping, but is sold in lumps. As "fresh butter" (rather improperly so called, as it is salted,) it has a rich taste and is highly esteemed. Much New York butter is, however, sold in Philadelphia as "tub or firkin butter," at higher prices than any of the same *age* made in that vicinity would command. From a paper lately read before the Chester County (Pa.) Agricultural Society, by D. B. Hinman, Esq., of West Chester, we take the following extract. Speaking of some northern and eastern dairies, he says:

"Very little of their butter is sent to market during the warm months; it is packed in firkins, sent to market late in the fall or early winter, and we now find it in the Philadelphia market coming in direct competition with our own freshly-made butter; not only so, but we find it here in the borough of West Chester, selling at prices far above what we obtain for butter made at the same time. To me this is evidence of our disposition to go on in the good old way of our fathers, without making even a respectable effort to find some way that would be more to our interests and in conformity with the circumstances of the day in which we live.

I tried an experiment last summer in a small way. In December I sold several hundred pounds of butter made in June and July, at thirty cents a pound, and have engagements from the same parties for another season. If one-half of the butter made in the vicinity of Philadelphia during the warm months, was packed on the eastern plan, those doing it would relieve themselves of a vast amount of trouble and expense, and would considerably increase their income, and greatly benefit those who have not the energy to try the experiment, by enabling them to obtain better prices."

Horse Barbering.

Nature provides for the caloric protection of the horse's body of the approach of winter, by causing the growth of a thicker and larger coating of fur. But our modern horse dealers have discovered that this protection is a mistake, so far as active working animals are concerned, and only intended for horses of leisure, that have nothing to do but to crunch their fodder and frisk about among the geese and hens of the country barn-yard. It is alleged, and apparently with philosophical correctness, that a working horse covered with nature's winter great-coat, will sweat more easily, and is therefore more liable to injury by cold, foundering, &c., than if its hair were shorter, because the heavy coat retains the perspiration moisture for a long time, and prevents proper drying off. Accordingly, the remedy is to clip the hair. This is a queer operation; and under the hands of an expert professor, the animal is "transmogrified" into "a horse of quite another color."

The clipping operation is commenced as soon as the winter hair is fairly grown. With a pair of splendid scissors and shears, the barber carefully clips off the horse's covering as closely as the nature of the cutting instrument will allow. But even the nicest shearing would necessarily leave some hairs longer than others, and the skin will present a jagged, uneven appearance. The next process, therefore, is to singe the horse, so as to burn off all stray protruding hairs, and secure a smooth, uniform surface. For this purpose, a shallow, oblong lamp is used, with a long inch tube, so as to produce a broad flame that will singe a considerable width of hair at once. The lamp is filled with alcohol. The operator holds a piece of tin plate in one hand, with which he lifts the points of the hair; the lamp carried in the other hand is then carefully brought up to the plate, and the hair evenly burned off. In this way the entire body of the animal is carefully gone over until the hair is all singed down to an even thickness.

After this, several blankets are piled upon the horse, and a profuse sweat is produced. He is then thoroughly scraped down with a steel blade, which removes all dirt from the skin, with the loosed hairs and singed ends. Thus finished off, the animal presents a sleek and natural sort of appearance.

The whole operation requires three days time of a good workman, and at the end of the process we would hardly know the animal by its color; and in all cases, the outer coat being removed, it is the short undergrowth hair that becomes visible. The clipping operation well done, costs ten dollars. The horse thus treated, of course requires heavier blanketing when standing in the stable; three thick blankets being usually employed. It is said that these clipped horses enjoy better health in winter, and will do more work than if the above manipulations were not practiced.—*Scientific American.*

Hay-Making.

As the season for making hay is approaching, we will give a few wards of caution in advance. *Don't dry your hay too much.* Hay may be dried till it is as worthless as straw. As a good coffee-maker would say, "Don't burn your coffee, but brown it;" so we say, don't dry your hay, but cure it. Our good old mothers, who relied upon herb tea instead of "potecary medicine," gathered their herbs when in blossom, and cured them in the shade. This is the philosophy of making good hay. Cut in the blossom, and cure in the shade. The sugar of the plant, when it is in bloom, is in the stalk, ready to form the seeds. If the plant is cut earlier, the sugar is not there; if later, the sugar has become converted to woody matter.

Hay should be well wilted in the sun, but cured in the cock. Better to be a little too green than too dry. If, on putting it into the barn, there is danger of "heating in the mow," put on some salt. Cattle will like it none the less.

Heat, light, and dry winds, will soon take the starch and sugar, which constitute the goodness of hay, out of it; and with the addition of shower, render it almost worthless. Grass cured with the least exposure to the drying winds and searching sunshine, is more nutritious than if longer exposed, however good the weather may be. If ever cured, it contains more woody fibre and less nutritive matter.

The true art of hay-making, then, consists in cutting the grass when the starch and sugar are most fully developed, and before they are converted into seed and woody fibre; and curing it up to the point when it will answer to put it into the barn without heading, and no more.—*Ohio Farmer.*

It is an easy matter to determine with much certainty the best time to cut hay so as to secure the greatest amount of nutritious matter; but the analyses which have been made afford no satisfactory information on this point. In the famous experiments of Sinclair, the amount of nutriment was estimated from the quantity of soluble matter in the various grasses cut at dif-

ferent stages of their growth. Such a method of analysis cannot give reliable results. Much of the crude, imperfectly organized matter of immature plants might be soluble, but no one will contend that it is nutritious.

This preference is unquestionably founded on a correct principle, the object of the farmer being to secure his hay so as to make it most like grass in its perfect condition. The nutritive substances of grass are those, which are, for the most part, soluble in water, such as sugar, gluten, and other compounds. Now if this is so, it is evident that the grass should be cut at the time when it contains the largest amount of these principles. From its earliest growth the sugar and other soluble substances gradually increase until they reach their maximum per centage in the blossom, or when the seed is fully formed in the cell. From this period the saccharine matter constantly diminishes, and the woody fibre, perfectly insoluble in water and innutritious, increases till after the seeds have matured, when the plant begins to decay. Of course, if the plant is not cut in the flower, a great part of the nutriment of its stems and leaves is wasted.—*Journal of Agriculture.*

Pumpkins among Corn.

A writer in the N. H. *Journal of Agriculture* says:

"Many farmers plant pumpkins with their corn. A few may not injure it perceptibly. It is believed by some that it takes as much nourishment to grow a good-sized pumpkin as a good hill of corn. If this be the case, where a number of loads are grown to the acre, we think the pumpkin cannot be of so much value as what the corn is diminished."

The sentiment here expressed is held by many. Now, who has ever known that pumpkins injured corn? Uncertain knowledge is no knowledge at all, so to speak. Who has any knowledge of pumpkins injuring the corn?

The corn has the first chance at the sun and air, at the dew and showers, at the soil too, and the manure. The pumpkins are planted later, and where the corn fails or is thin, or perhaps are planted uniformly over the field, and at most there will not be more than one pumpkin-vine to twenty-five corn plants. Corn takes one class of substances from the soil, the pumpkins quite a different class, and so it seems to us that with the knowledge of many a fine load of pumpkins raised among corn, and no proof that materially, or even any, less corn is raised, it is safe to plant pumpkins with all small-stalked, low-growing kinds of corn, at any rate. If the land is in good condition, the amount of fodder lost by using a small-stalked variety of corn will be more than made up by the yield of the pumpkins. Large varieties of corn shade the ground so that pumpkins seldom do well.—*Homestead.*

Cauliflowers.

Dr. Johnson of dictionary notoriety, said that the cauliflower was the best of all flowers. I am not disposed to place so great a value on this vegetable, although it forms a very desirable dish, when properly grown and cooked.

I have seen some good plants produced in frames, but I consider that a very costly way of growing it. I have been successful in its culture, by treating it the same as any other kind of cabbage.

Some time in May the seeds are sown in a bed, along with those of late cabbages and savoys. About the end of July they are planted out in ground well manured. I think the soil should be plowed or dug to a good depth, and it cannot well be too rich, indeed they will not amount to much unless the soil is in the best heart with manure. The plants are set out in rows two feet apart, and receive no care in summer except frequent hoeings, to keep them clean and the soil mellow. If the weather in the fall should be dry, some of them will form flowers as early as September, but they will be small; the best will not flower until later, and many of them may not do so before frost. These are lifted carefully and set closely in a corner of the garden, and covered over with a foot of dry leaves or straw. Here they will head during winter; and I have frequently not disturbed them until New Year's Day, when I have gathered a fine dish.—*Corresponden Farmer and Gardener.*

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JULY.

"Majestic Summer! pardon that my lays
Till now forbore to celebrate thy praise;
The fervid splendor of thy mid-day sun
With wonder strikes me, though its fire I shun,
I love thee most, whene'er thy potent rage
Or Autumn's breath or vernal gales assuage,
Though Nature pant beneath thy noon-tide power,
How sweet the freshness of the evening hour!
What time the night, throughout the gelid air
Veils with her sable wings the solar glare;
Then loves the eye, that shrunk before the day,
To drink refreshment from the moon's pale ray;
When modest Cynthea, clad in silver light,
Expands her beauty on the brow of night,
Sheds her soft beams upon the mountain side,
Peeps through the wood, and quivers on the tide."

WORK FOR THE MONTH.

WHEAT HARVEST.

The Wheat harvest, where it is not yet finished, will demand the closest attention. It cannot be laid aside until the crop is made entirely secure. This should be done, of course, as early as practicable after the crop is in condition to be harvested. Wheat may be better secured in the field if put up properly in bunches called "dozens" than in the common method of shocks. Much of it will be sprouted in the shocks in long spells of wet weather. There need be none in the other method.

HAY MAKING.

Clover Hay and Orchard Grass will have been already secured. Red top should be cut when in flower. Low land grasses liable to flooding, it is well to cut by the middle of the month. Timothy should be cut when the seed is in milk. It makes a much heavier crop at this time and of much better quality than if cut earlier. At this stage of the growth, the roots are less liable to injury by drought. Cut four inches from the ground. If cut too close the roots are liable to perish. To cure well it should lie but a few hours in the sun. Then it should be thrown lightly into small cocks until it sweats. Then it will be sufficiently exposed to the air, while being removed to the barn or mow in favourable weather.

BUCKWHEAT.

This grain may be sown up to the 20th of the month. About three pecks of seed is sufficient for an acre. Prepare the ground well and give a hundred weight of guano or its equivalent unless in pretty good heart. Plough under the seed with a light furrow, putting in the manure by the same operation. The grain is liable to waste in harvesting. It should be cut when the dew is on or in damp weather, and put into small cocks in the field for a short time. It is liable to mould if put in the barn too early.

FIELD PEAS.

These may still be planted.

MILLET, HUNGARIAN GRASS, BROAD CAST CORN.

Any of these may still be sown if an addition be wanted to your provender.

CORN.

If you find it necessary to give your Corn further working after harvest, it must be done with care in hot, dry weather. Go over the field, first working only every other row, and complete it by going over again, working the alternate rows which were untouched before. This will pre-

vent the tearing and cutting the roots on each side of the Corn at one time.

TOBACCO.

Under the present aspect of affairs, Maryland Tobacco growers may anticipate good prices for their crops, and those who have planted should use their utmost effort to get a full crop. It should be kept now thoroughly clear of grass, and in the nicest tilth, that a quick, unchecked growth may be secured. Worms should be kept down from their first appearance, and the poison for destroying the horn-blower used which we have so often recommended.

POTATOES.

It is not yet too late to plant Potatoes. Medium sized whole ones only should be planted now. Plant in a freshly opened furrow and cover immediately. Keep clean and well worked till they blossom.

RUTA BAGAS.

If these are to be sown, get the ground in order as early in the month as you can. Have it manured with four hundred weight of guano, or five hundred of superphosphate, or its equivalent in some other fertilizer. Or use twenty horse cart loads of pretty good farm-yard manure and half the quantity mentioned of guano. Sow from the 15th to the 30th of the month.

THE VEGETABLE GARDEN.

JULY.

Keep all garden crops that are growing, well worked and clear of weeds.

CABBAGES.

Set out plants for principal crop. About the middle of the month is perhaps early enough, but they may be still planted till it closes. Let the ground be well prepared and highly manured with anything but hog-pen manure.

CELERY.

This valuable winter vegetable should be planted out this month for principal crop. Moist, rich soil is best for it. The trenches should be manured with well rotted stable or barn-yard manure, well chopped in with the soil. Trim your plants, the tops to the length of six inches, and the roots to two inches. As soon as planted give them a plentiful watering, and shade them till they have taken root.

TURNIPS.

A small quantity for early use may be sown this month. For the winter supply the 10th of August is time enough to sow. In the meantime let the ground be well prepared.

CARDOONS, ENDIVES AND LEEK.

Set out plants of these for main crops.

BEETS AND CARROTS.

Seeds of these may still be planted and make good roots.

RANGOES AND CUCUMBERS.

Plant seeds of these for pickling.

CAULIFLOWERS.

Plants of these for winter use should be set out.

RADISHES.

The last of the month sow seeds for fall use.

SEEDS.

As seeds ripen cut off the stems and spread in a secure place to dry. When cured, rub them out and tie in paper or cotton bags, properly labelled.

HERBS AND MEDICINAL PLANTS.

As these come into flower, gather and dry in shade.

FRUIT GARDEN AND ORCHARD.

Examine budded and grafted trees and rub off buds that may have started from the stock.

Pick off punctured fruit, and gather all that falls and have it destroyed. A great increase of the villainous insect might be prevented by a faithful attention to this direction every week or so.

Large quantities of wasps, ants, and other insects that destroy the ripening fruits, may be trapped by hanging about the choice fruits phials of sweetened water.

Cut off suckers from the roots of choice trees. Cherries, Plums, &c. may be budded this month. Strawberry beds should be cleaned out and no runners allowed to grow except where new plants are wanted.

THE VINEYARD.

Growing vines should be kept properly tied up as they advance, and the ground kept quite clear of weeds and grass.

THE FLOWER GARDEN.

ANNUALS.

Plants of late sown annuals, as *Balsams*, *Cozcombs*, *Amaranthus*, China Asters, may be still set out. Take up with trowel, and water till they begin to grow, keeping the soil stirred about them.

BIENNIAL AND OTHER FLOWERING PLANTS.

Such of these as were not heretofore planted should be now set out in beds and watered and shaded till they root. Of these are Wall Flowers, Sweet Williams, Canterbury Bells, Gilliflowers. Let them remain in these beds till fall, when they are to be finally planted where they are to bloom.

PINKS.

Pinks of all kinds should be propagated this month by layers or pipings.

FLOWERING PLANTS.

Such as need support should be tied up to neat stakes. Cut off stems that are done blooming unless wanted for seed. Peg down *Petunias* and *Verbenas*.

HEDGES.

Hedges should be clipped in damp or cloudy weather.

GRAVEL WALKS.

Sweep and roll weekly.

THE GREEN HOUSE.

Seedlings and plants from cuttings put down in spring, may now be put in pots. Gather seeds of all sorts that are ripe. Oranges and Lemons should be thinned when bearing too full. *Azaleas* should be protected from sun and kept watered. *Camellias* may be repotted.

Air and Water.

The weight of the atmosphere is equal to that of a solid globe of lead sixty miles in diameter. Its principal elements are oxygen and nitrogen gases, with a vast quantity of water suspended in them in the shape of vapor, and commingled with these a quantity of carbon in the shape of fixed air, equal to restore from its mass, many fold, the coal that now exists in the world. In common with all substances, the ocean and the air are increased in bulk, and, consequently, diminished in weight, by heat. Like all fluids they are mobile, tending to extend themselves equally in all directions, and to fill up depressions wherever vacant space will admit them; hence, in these respects, the resemblance between their movements. Water is not compressible or elastic, and it may be solidified into ice, or vaporized into steam; the air is elastic; it may be condensed to any extent by pressure, or expanded to an indefinite degree of tenuity by pressure being removed from it; it is not liable to undergo any change in its constitution beyond these, by any of the ordinary influences by which it is affected.—*M. F. Maury.*

Preparation of Bones for Use.

The best and cheapest method of preparing bones for manure is, first, to boil them in strong ley a few hours, to extract from them the animal matter, or what would be more convenient, perhaps, break them as fine as convenient, and put them in a tub of ley to remain there during pleasure, until the animal matter is all extracted and incorporated with the ley. The mineral part of the bones will now be found very friable and easily pulverized. They should be rinsed clean, pulverized, and put into another tub or trough. Apply to them some diluted sulphuric acid, in the proportion of one of acid to five of water. Stir them frequently, and in a short time they will be entirely decomposed and fitted for use. These two masses, being equally rich in the elements of fertility, the one of ammonia and the other of phosphorus, are equally valuable as fertilizers, and adapted to any and every variety of soil that may be deficient in these elements, and equally necessary for the healthful maturity of every growing plant, whether of grain, grasses, or roots. I now advise a mixture of these two masses with the general compost, to secure a general diffusion of them upon the different fields to be manured. My reason for the general diffusion of these masses upon the different fields is, first, every plant needs them. Secondly, the farmer's resources, in this line, will be mainly within himself. This will be true of those that live at a distance from villages and cities. Their resources must be small. Thirdly, the elements of the bone, both animal and mineral, were taken from the different fields, and should, therefore, be returned to the same fields. To keep up the fertility of each field, it is necessary to return to it annually the same elements that are taken away. The farmer may secure a larger crop of any kind, on any field, by robbing other fields of the same elements of fertility to enrich that one. But such a policy would not only be bad, but ruinous if pursued.—*Country Gent.*

CLOVER ROOTS.—At the meeting of the Board at Watertown, President Geddes had some clover roots furnished him by a farmer in Onondaga county, one of which measured three feet eight inches, and the roots entered the ground as tap roots. The longest one was evidently broken off in taking up, and probably was six or eight inches longer, making it more than four feet; the others nearly as long. Such appendages as these to the clover plant, in friable soil, may well account for the great value of this plant as a fertilizer.—*N. Y. Jour. State Ag. Soc.*

Philosophy of Drainage.

A well-known fact with regard to under-draining is, that many soils, constituting a large portion, perhaps a majority, of the earth's surface, are all right by nature. They are so porous, both the surface and the subsoil, that water passes downward with sufficient freedom, and that the air traverses freely as far down as they are ploughed and subsoiled. What we want in a soil is, that it should be permeable to water and air, and should be so constituted chemically (have so much clayey and carbonaceous matter in it) that it will be *retentive*—that is, will not suffer the dissolved matters in rain water to pass through, nor the gaseous matters in the air to escape from it, but will hold them both for the crops. It should be understood that every drop of rain that falls on the soil brings manure with it, as also every particle of air in the soil. Thus, nature is always manuring our fields, so long as we stir the soil and keep it physically in a proper condition. On all soils passably well constituted chemically, her manuring is, and always will be sufficient to secure medium crops. We add to her manuring only because we have discovered (some of us at least) that there is more profit in large than in merely medium growths.

But although many soils are very well as they are, without underdraining, and are half manured, and always will be, by nature's operations, others are not. It pleased the all-wise Creator to leave a large portion, perhaps half, more or less, of the earth's surface in such a condition that it should afford a field for man's genius as well as his labor. These are, oftener than otherwise, the very best of soils, chemically endowed with all the ingredients required for an almost endless series of crops, but mechanically unfit for the highest culture, till the genius of man, added to the workings of nature, shall have prepared them for husbandry. Some have a clayey surface, through which water passes so slowly, that it drowns in wet weather and bakes in dry. Others have a porous surface, but an impervious subsoil, through which the water cannot pass, and so returns to be evaporated from the surface; and every particle that evaporates leaves a chill—makes the soil cold, sour, uncongenial to plant life.

Why can you not heat a kettle of water above 212°? Because, at that temperature, the evaporation carries off heat from the surface just as fast as you can infuse it from below by the hottest fire you can make, and so the temperature remains in *statu quo*. You cannot raise it above 212° unless you impede evaporation by pressure. Stop the evaporation, and you may heat water as hot as you can iron, but not while the evaporation goes on. And why does the man who works in your field in a hot summer's day suffer no more, perhaps less, with heat, than the lazy man who is standing about? Because the working man perspires. The moisture evaporates from his body and garments, and carries off all the artificial heat caused by exertion. The reader can now understand that evaporation from soil cools it. As the heat of the most tremendous fire you can make will not raise the temperature of boiling water in an open vessel, and as the laboring man is never heated above the natural temperature of the human body, so the soil cannot be heated above the point depending upon the joint action of the sun and evaporation—the one tending to heat it, the other to cool it. A soil but slightly moist on the surface, and with no stagnant water for three feet below, may be heated at noon-day to at least 120°; but it would be as impossible for the sun to heat a water-logged soil to that degree, as for you to heat an open kettle of water above 212° by thrusting fuel under it, or for a laboring man to heat his body above its natural temperature by hard work. Over a water-soaked soil, the heat of the sun, instead of insinuating itself among the particles of earth, is dissipated by evaporation; or, in other words, it is used up in evaporating the water, and not in warming the soil.

What we want, in regard to soils on which, or in which anywhere within three feet of the surface there is stagnant water, is a free circulation. Something is to be done, which will give the water a free passage in all directions. If the water circulates freely, the air will; for it may be laid down that wherever the water sinks in a soil the air follows it—is pressed in by the superincumbent air, weighing fifteen pounds to every inch of surface, which amounts to a pressure of 2,160 pounds to the foot, and 58,806 pounds on each rod. No one doubts that the fish at the bottom of the ocean are living under a heavy pressure; but not every one has reflected that we are living at the bottom of an aerial ocean, the pressure of which is in all directions, and amounts to thirteen tons on a man of medium size, and is quite sufficient to press air into the ground and among all the particles of the soil, as soon as the excess of water is drained off. Take out the water, and the air will follow of course. The particles of soil will touch each other, but being rough and irregular there will be spaces between them, and these will be no longer filled with water but with air, and both the moisture and

the air will circulate freely, and will both give up their manurial properties to the soil. If in digging into a soil, the moisture is very unequal —the surface almost dry, and the soil at any point not more than three feet below very wet—there is something wrong in that soil; for, if the water at three feet below the surface could pass freely downward, the water in the next stratum above would fall into its place, and so on upward to the surface.

There wants to be an equalization of the water, for three feet downward, so that the surface shall not become entirely dry by a long suspension of rain, nor be excessively wet after heavy rains. All this can be effected by drainage. Lay down your drains thirty feet apart and three feet deep, or forty feet apart and four feet deep, or fifty feet apart and five feet deep, and very soon, the bottom water being taken off, all the surplus water above will have fallen, the soil will have crumbled, the moisture will have equalized itself, air will be in circulation throughout, and you will need have no fear of drenching rains and may laugh at the drought. It seems strange (to those who do not comprehend the reasons), but is true nevertheless, that underdraining affords a perfect guarantee against damage both from drought and from excessive rains. The principal benefits of drainage are the following:

1. It prevents washing, by admitting a sudden fall of rain quickly into the ground, leaving little to run off.

2. It enriches the soil, by causing it to absorb the rains quickly, to lixiviate them, and to retain for the use of plants their carbonic acid, ammonia, and other manurial matters, instead of running them off together with some of the richest top soil into a neighboring brook.

3. Stiff soils are more easily worked. In such a soil you can plough eight inches deep with a less draft than it would have before required to plough six; and the soil will fall from the mould finely pulverized instead of falling in lumps.

4. All kinds of manures will have a quicker and a better effect.

5. Seed time will come earlier. Fall frosts will hold off later; and thus the season will be prolonged. In the North this is a great advantage, for our seasons are too short at both ends.

6. A greater variety of crops can be grown, and so a wider choice and a more perfect rotation be practised.

7. Drained land will continue longer to give crops without manure than undrained, because the roots have a wider range for food, and when manured will give a greater increase for the same amount of manure.

8. When laid down to grass, they will not deteriorate as soon, and for the reason that the grass-roots penetrate deeper, the pasturage will be more uniform through wet and dry weather, and will be earlier in the spring and hold out later in autumn.

9. Drainage improves the climate. From the effect on the soil, and especially by diminishing evaporation, we might safely infer that its tendency would be to dry the atmosphere, to free it from miasms, and render it more conducive to health. But we are left to no doubtful inferences. In England, in the well drained regions, the average of human life has actually been prolonged several years, under circumstances where it can be attributed to no other cause.— *World.*

Existence of Nitrogen in Plants—Its Origin in Animals.

BY CHARLES T. JACKSON, M. D.

Many years ago, while a student of medicine, the writer essayed to prove, by exclusion, that animals derived their nitrogen from food, and that since exclusively herbivorous animals apparently contained as much nitrogen in their tissues as carnivorous ones, he argued that the nitrogenous element of plants must have been overlooked by chemists and physiologists. We were taught in those days that nature produced all the varied products of the vegetable kingdom by means of the three elements, carbon, hydrogen and oxygen, and that animal matter differed from vegetable, owing to the addition of nitrogen. Organic chemistry, then almost unknown, or certainly in its infancy, had not disclosed the fact of the existence of nitrogen in vegetable matters, in nearly the same proportions as in those of animal origin. It had, indeed, been observed that cabbages, turnips, and some other plants of the cruciferous order, on putrefaction gave out the sulphide of ammonium, then called hydrosulphate of ammonia, a fact which pointed to the existence of sulphur and some nitrogenous ingredient in plants of that order, but this was considered an exception to the rule. Notwithstanding the proofs that animals do not derive their nitrogen from the atmosphere by pulmonary or by cutaneous absorption, and that there was no other way by which this element could be introduced except by the stomach, in the form of food, and that animal life could be sustained by an exclusively vegetable diet, the books on chemistry, botany and physiology continued

to ignore the existence of nitrogen in plants.—At length analytic chemistry reached into the domain of organic products, and Dumas, Cahours, Liebig, and others demonstrated that vegetable matters contain nearly the same proportions of nitrogen as those of animal origin. There still exists a doubt as to the mode of combination of the elements in these two forms of matter, and it is highly probable they will prove additional instances of isomerism. We know, for instance, how readily we can distinguish most animal matters from those of the vegetable kingdom by the simple test of combustion. A portion of animal fibrine, albumen, or gelatine can thus at once be distinguished from any vegetable product, the so-called animal odor in the smoke being readily recognized. A single fibre of cotton, or of linen, may thus be distinguished from one of silk or of wool, the two last giving the odor peculiar to animal matter, on combustion, while the two former give the smell of burning wood or paper.

Animal matters, on being heated to a temperature sufficient to decompose them, break up chiefly into nitrogenous compounds, while vegetable matters of identical composition break up under the same circumstances into hydro-carbon and water. Here, then, is a curious and important department of organic chemistry for further examination. Recent experiments on the production of oils, paraffine, and numerous other valuable products of decomposition of vegetable matters at regulated temperatures, have thrown much light on the phenomena of decomposition and recomposition of organic substances. The matters which we obtain by distillation did not pre-exist in the substance decomposed by heat. For instance, there is no paraffine in peat, but it is produced by a re-combination of the hydrocarbonaceous elements, at a certain temperature. Bituminous coals contain no bitumen, as may be proved by digesting them in benzole, which would at once dissolve it if any existed in the coal.

If we heat the coal until it softens, we produce bitumen abundantly, and it may now be dissolved out by the aid of the benzole. Only one kind of coal—that called asphaltic coal—yields any bitumen before it is roasted. The Albert, N. B., coal yields 15 per cent. of soluble bitumen, but this is an exceptional case. Again, paraffine, according to the researches of Mr. Atwood, is capable of being again broken up into volatilizable and permanent oils, and many heavy oils have been by him re-arranged in their elementary combinations, so as to give entirely new products. These are examples of changes effected in organic matters by the agency of regulated heat.

By the assimilatory powers of animal organism, more wonderful changes are effected in vegetable matters. All the complicated fluids and solids of the animal body are brought forth from the elements of food, and the vegetable proximate principles have their elements re-arranged and adapted to the purposes of animal life. It is probable that the animal economy cannot tolerate, in the circulatory system, any purely vegetable combinations of matter, and that, if the conversion into animal combinations does not take place, the introduced matter acts as an irritant, and is expelled by the secernent organs. Sugar, as such, certainly acts as a powerful irritant on the kidneys, as is shown by dissection of a diabetic subject.

The failure of the organs in the conversion of this substance into proper circulatory food is now well known to be due to a disorder of certain of the spinal nerves, or to the medulla oblongata.

Oil, injected into the blood, acts as a poison, because it has not been carried through the regular organs for its assimilation. Both sugar and oils are good respiratory food, but they must first be introduced through the organs of digestion, and be carried in succession through the various organs instituted for their preparation. Milk, in any other organ than the stomach, will not act as food. Injected into the blood, it would prove an irritant if not a poison, for its elements are not so combined as to fit it for the circulatory vessels.

In order to explain how closely animal and vegetable proximate principles resemble each other, as shown by ultimate or elementary analysis, I subjoin some of the results of analyses made by Dumas and Cahours, still calling attention to the fact that these bodies do differ in the mode of combination of their elements as before stated:

	Vegetable Albumen.	Albumen of Eggs.	Albumen of Serum.
Carbon	53.74	53.37	53.82
Hydrogen	7.11	7.10	7.29
Nitrogen	15.66	15.77	15.70
Oxygen	23.50	23.76	23.69

	Fibrine of Flour.	Of Human Blood.	Of a dog fed on bread 2½ months.
Carbon	52.23	52.78	52.57
Hydrogen	7.01	6.90	7.07
Nitrogen	16.41	16.78	16.55
Oxygen	23.35	23.48	23.81

	Casein of Flour.	Of Woman's Milk.	Of Cow's Milk.
Carbon	53.46	53.37	53.55
Hydrogen	7.10	7.19	7.03
Nitrogen	15.64	15.60	15.77
Oxygen	23.80	23.84	23.65

It will be seen that these matters are nearly of the same composition, as shown by elementary analysis; but still, under the test of destructive distillation, animal and vegetable substances will break up into entirely different products, and by their known difference in digestibility it would appear that they are differently acted upon, and undoubtedly different organic products are formed from them in the organs of assimilation.

It should be noticed, also, that the small proportions of sulphur and phosphorus, or their salts, which exist in those proximate principles of animal origin, and not in those derived from vegetables, are not considered in Dumas' analyses above quoted. In the process of nutrition, of course, these elements are of great importance. However, it will be seen that in ultimate analysis animal and vegetable matters are essentially alike; that the pure fibrine of the oak and that of the human heart cannot be distinguished by such analysis, though by simple combustion in the flame of a candle, we may know which was from the vegetable and which from the animal. —*Boston Medical and Surgical Journal.*

Is Guano Nought but a Stimulant?

The first sample of guano is reported to have been taken to Europe by Humboldt in 1806. In 1840 a few barrels were imported into England; and from that time down to the present the quantity imported has increased with the increasing demand until the annual consumption has reached 240,000 tons, equal to 537,600,000 lbs., and calling 60 lbs. to a bushel, 8,960,000 bushels. And yet notwithstanding this immense importation of Peruvian guano by one of the most skilful, learned, successful and frugal agricultural people known at the present epoch of the world's history, there are those who assert that "guano is not a fertilizer but a 'stimulant' causing an artificial or forced growth by which the plant takes from the soil more fertilizing matter than the guano brought to it." Its influence has been further compared "to that of brandy upon the human system, denying that it is a fertilizer and affirming that it is a stimulant."

A fertilizer is defined to be a manure, organic or inorganic, and it is applied to soils where it acts sometimes in the double capacity, not only as plant-food but as a chemical agent upon the soil, forcing it to give up what is essential to the nutrition of plants which otherwise would be unavailable to the growing plants, and therefore practically, so far as an immediate crop is concerned, might as well not be in the soil.

The following minute analyses of three specimens of Peruvian guano is taken from Professor Anderson's tables, showing all the different constituents it contains, and the amount of difference which may exist:

	I.	II.	III.
Urate of ammonia	10.70	9.0	3.24
Oxalate of ammonia	12.38	10.6	13.35
Oxalate of lime	5.44	7.0	16.36
Phosphate of ammonia	19.25	6.0	6.45
Phosphate of magnesia and am.	....	2.6	4.20
Sulphate of potash	4.50	5.5	4.23
Sulphate of soda	1.95	3.8	1.12
Sulphate of ammonia	3.36	....	....
Muriate of ammonia	4.81	4.2	6.50
Phosphate of soda	....	....	5.29
Chloride of sodium	....	....	0.10
Phosphate of lime	15.56	14.3	9.94
Carbonate of lime	1.80	....	....
Sand and alumina	1.59	4.7	5.80
Water	9.14		
Undetermined humus-like organic matter	10.00	32.3	23.42
	100.48	100.0	100.00

These examples show different stages of decomposition: *e. g.* the quantity of urate of ammonia is less in the last example than either of the former, and much less than in fresh dung which contains from 50 to 70 per cent. of uric acid; and 2dly, that guano is rich in all the constituents of plants, and especially so in ammonia, the best form in which nitrogen can be supplied, in uric acid which by decomposition yields ammonia, and in phosphoric acid. And notwithstanding this we are told that "guano is not a fertilizer, but a stimulant." Before, however, proceeding to speak of "a stimulant," I will invite attention to the analyses of the excrements of the horse, cow, sheep and swine, as given in Prof. Anderson's table.

The percentage of water in the fresh excrements of the animals named, is as follows:

	Horse.	Cow.	Sheep.	Swine.
Water	77.25	82.45	56.47	77.13
Ash in the dry ex't	13.36	15.23	13.49	37.17

100 parts of the ash contained:

	Horse.	Cow.	Sheep.	Swine.
Silica	62.40	62.54	50.11	13.19
Potash	11.30	2.91	8.32	2.60
Soda	1.96	0.96	3.28	3.44
Chloride of sodium	0.03	0.23	0.14	0.89
Phosphate of iron	2.73	8.93	3.96	10.86
Lime	4.63	5.71	18.19	2.63
Magnesia	3.84	11.47	5.45	2.24
Phosphoric acid	8.93	4.75	7.52	0.41
Sulphuric acid	1 83	1.77	2 69	0.80
Carbonic acid	....	trace	trace	0.00
Oxide of manganese	2.13	....	....	....
Sand	....	....	....	61.37
	99.80	99.29	99.66	99.82

The organic constituents of plants are carbon, hydrogen, nitrogen, and oxygen. The inorganic are potash, soda, lime, magnesia, peroxide of iron, silicic acid, phosphoric acid, chlorine, and more rarely manganese, iodine, bromine, and fluorine, all of which are obtained from the